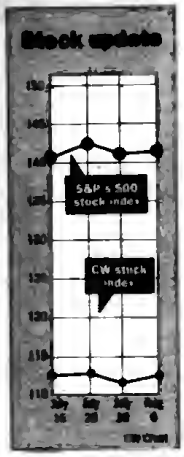
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

# COMPUTERWORLD

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**DEC aims at traditional IBM markets** with more VAX products and a revamped marketing strategy. **Page 10.**

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**A court decision against Data General** to force systems vendors to unbundle software, according to legal observers. **Page 118.**

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**Top Ford information systems executive** explains decision to rely on IBM in developing comprehensive office automation strategy. **Page 71.**

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**Sun Microsystems' latest products** herald renewed battle in engineering workstation market. **Page 4.**

■

**The leading artificial intelligence conference** focuses on practical applications. **Page 6.**

■

**Network manager's nightmare** solved with remote management package. **Page 45.**

■

**The eleventh-hour cancellation** of a meeting with analysts last week has triggered more speculation that all is not well at Convergent Technologies. Although Convergent President Paul Ely said the meeting was rescheduled to coincide with fall product announcements and new developments in vertical market efforts, sources continue to hint at the possibility of layoffs or wage freezes at the systems manufacturer.

■

**McCormack & Dodge** next week will introduce a version of its application development system, Millennium:SDT, for IBM's DB2 at its users group conference in Reno, Nev. It will also announce a version of its general-ledger application package for Cullinet's IDMS DBMS, company spokesmen said.

■

**IBM last week confirmed** it is "redeploying" some workers from its Rochester, Minn., plant, where the System/36 and 38 are manufactured, to its Rolm sub-

See **NEWS** page 8

# Bugs plague $50M system

## Fannie Mae battles delay, critics in loan conversion

**By Mitch Betts**

WASHINGTON, D.C. — The nation's largest supplier of home mortgage funds is about to move records on four million loans to a new $50 million computer system that skeptics say will not work and that corporate spokesmen admit is $25 million over budget and 19 months behind schedule.

The enormous cost overrun and installation delay occurred largely because the new system was riddled with some 1,000 software bugs, necessitating 13,000 tests by a staff of 60 working 12-hour shifts, including weekends and holidays.

The critical test will come Oct. 1, when the Federal National Mortgage Association, the government-chartered corporation commonly known as "Fannie Mae," shuts down its current batch processing system and turns on a new Laser Reporting system. The soon-to-be-outdated Aggregated Exception System ran on a Control Data Corp. Cyber machine, whereas Laser Reporting runs on an IBM 3084 mainframe using the MVS operating system and Cullinet Software, Inc. IDMS software.

Despite Laser Reporting's troubled three-year history, William A. Dawson, executive vice-president for technology at FNMA, expressed confidence that it will work Oct. 1, when an initial batch of two million loans are scheduled to be put into the data base management system.

In response to publicly expressed doubts that the system will run smoothly, and in light of the software problems, Dawson said his department has spent a year of testing to eliminate Cobol software bugs, including using 10% of Fannie Mae loan records. Information regarding the

See **BUGS** page 2

# Mac Dbase readied, amid user doubts

**By Douglas Barney**

Ashton-Tate is expected today to make a belated entry into the Macintosh software market, launching a version of its Dbase III program for the Apple Computer, Inc. product.

Ashton-Tate's move has revived debate over whether a single strong software product can generate sufficient enthusiasm to make the Macintosh a sales success with business users who have been slow to endorse the non-IBM-standard computer.

Users contacted last week, including one who had standardized on the Macintosh, were skeptical of the impact that Ashton-Tate's entry would have on the Macintosh market.

"There will be virtually no impact

See **DOUBTS** page 9

# Net to test OSI compatibility

**By Elisabeth Horwitt**

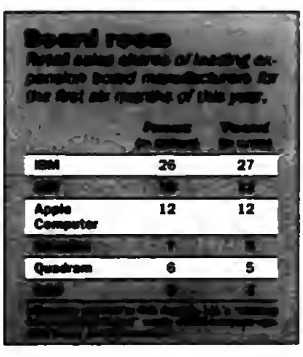
GAITHERSBURG, Md. — OSInet, a prototype network that is currently under joint development by 25 vendor and government organizations, will begin operations later this month. Ultimately, the project will guarantee business users that computer and networking products from different vendors will exchange data and documents using Open Systems Interconnect protocols.

Vendors can use OSInet to test unreleased products for conformity to the OSI communications protocols being devel-

See **NET** page 12

## CW SPECIAL REPORT

# *Add-on boards: Solution overload causes problem for managers*




**By David Bright**

The rapidly expanding number of personal computer add-on boards and manufacturers has provided users with a wealth of options. But microcomputer managers say that luxury has also spurred a host of problems in selecting the products best suited to meet their corporate needs.

Corporate users require a wide range of options for their various applications. Many users need extra memory for large applications or for multitasking; others require advanced graphics capabilities; and, very often, the PCs need to be hooked up to IBM mainframes, System/36s and 38s. Most of these situations require add-in boards.

In making purchase decisions, managers are faced with competing products from established companies and lesser known start-ups, and they must decide whether to buy directly from vendors or through third-party dealers and distributors. More important, some managers say, they must determine whether the options their users desire — often a series of add-on modules — are indeed compatible with existing hardware and software.

Relying on one of the dominant vendors does not guarantee good results, says Rick Strayer, who until recently was PC resource manager at H. B. Fuller Co., a large glue and solvent manufacturer in St. Paul, Minn. When Strayer looked at emulation

See **ADD-IN** page 6

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NEWSPAPER

# Teen hacker charged with Congress, school break-ins

By Susette Burton

ROCKY RIVER, Ohio — The Rocky River police recently charged a 17-year-old with using his home computer to break into computer systems around the nation, including ones in local schools and in U.S. Congress.

Sgt. Lyle Westerfield of the Rocky River police said the juvenile was charged July 29 in the Cuyahoga County Juvenile Court with theft of services and receiving stolen property, which consisted of telephones taken from the Lakewood City School District.

Westerfield said the youth allegedly used the long-distance telephone lines of Cleveland companies to hook up with computer systems in other cities, including those of the Lakewood City School District, the Milwaukee School District, the University of Texas and Congress.

"He used his Commodore 64, a basic home computer, to post the passwords on an electronic bulletin board," Westerfield charged.

By keeping a record of all logon attempts, Lakewood City School District DP manager Don Mayle said he could tell that the youth was trying to access the Ohio Career Guidance Information System account.

Officials were not able to divulge any information about the alleged break-in to systems to Congress. Inspector Robert Howe of the U.S. Capitol Police said he could not comment on whether there is a tie-in between incidents on Capitol Hill earlier this year and the allegations reported in Rocky River.

# Bugs plague $50M system

From page 1

bugs was first made public by two former project programmers who had been forced to resign after allegedly objecting to their overtime work.

Dawson, however, said that a year of rigorous testing to rid Laser Reporting of software bugs, as well as a successful pilot test, ensures that the system will work.

Even with the bugs eliminated, Dawson acknowledged that the switchover embodies risks, mainly because the old reporting system will be shut off at the same time the new one is turned on.

"We're taking every step we can to make sure it works, because this system is so different from the current system that we can't parallel it at the time of installation," Dawson said.

### Cause for user concern

The software problems and lack of a backup during the initial operation period may be cause for concern among the agency's customers. "I'm not real confident it will work. A lot of things make me real apprehensive about the whole thing," commented a systems analyst at an Ohio mortgage firm, who insisted on anonymity.

The government-chartered corporation wants Laser Reporting to provide monthly updates oo more than four million loans, based on monthly accounting reports filed by lenders.

The old Aggregated Exception System is batch-processed on a Control Data Corp. Cyber mainframe and contains ooly 20% of Fannie Mae's loan portfollo. The new Laser Reporting system is expected to replace not only this system, but also three other loan reporting systems in a phased process beginning in 1987. The four systems are incompatible but will be integrated in tbe Laser system.

For a variety of reasons, Fannie Mae missed its March 1985 deadline for implementing the system, so it now is committed to start up on Oct. 1. Consequently, the 60-member staff is working 12-hour shifts around the clock, including weekends and holidays, to meet the deadline, Dawson confirmed. Hal Burd, manager of the Laser project from 1983 to 1985, said the original cost estimate for Laser was roughly $20 million. Burd is now senior vice-presideot for operations at Horizon Financial Corp. in Gaithersburg, Md.

"We found more program bugs than I anticipated, and therefore . . . our people have worked more hours and gone through a lot more than my schedule anticipated," Dawson said, adding that he is aware that some staff members are unhappy about the arduous schedule.

Two senior programmer/analysts, Frank Rega and Barry Crawford, were forced to resign after they balked at working the long hours.

"Fannie Mae made a big public commitment to go live with the system. They don't want to be embarrassed, so they're going to push this thing through . . . no matter what," Rega said.

Dawson, in response, said that although some programmers have spent 24 hours on the job, on average the employees are working 9 hours a week in overtime, which he called "par for the course for our business.

"We have 1,500 customers. I can't set up a schedule and move it without inconveniencing all those customers. And so it's almost a holy date with us, and we have to make it," Dawson explained.

Crawford criticized the Cobol programs as overly complex, making them hard to debug. "They went hog-wild," he said, "writing over a thousand modules. A reporting system shouldn't be that complex no matter how big the organization."

Dawson, however, said the programs had grown complex because of numerous changes in Fannie Mae's business during the three years of development, but he added that the program bugs have been easy to fix because the system is well designed.

The system employs numerous Cobol programs written under the supervision of the Arthur Andersen & Co. consulting firm.

"We've found about 1,000 program bugs, but they've all been modest in terms of difficulty to fix. I think that says that we've applied a lot of change, but we have a very well-designed system," Dawson concluded.

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*ILLUSTRATIONS ON PAGE ONE AND 17 BY ALAN WITSCHONKE*

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# Sun broadens line, signals workstation war

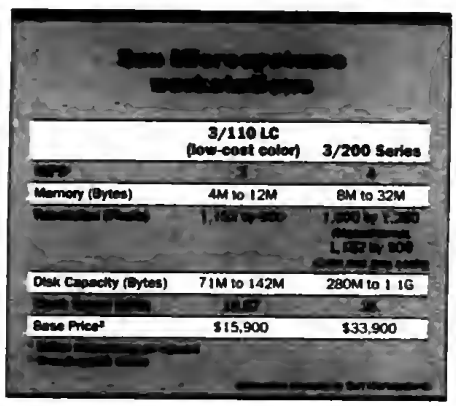
## DEC, Apollo expected to answer with rollouts

**By Rosemary Hamilton**

Making the first move in what is expected to be another round of intense competition among the major workstation vendors, Sun Microsystems, Inc. gave its product line a major face-lift last week. The company added low- and high-end models, cut mid-range prices and introduced the first version of its operating system that combines the University of California at Berkeley 4.2 and AT&T System V versions of Unix.

"It's a major move forward, and it was typical Sun — very aggressive in price and performance," said Robert Herwick, a senior analyst at Hambrecht & Quist. "What's really positive is the broadening of its product line."

Included in Sun's announcements last week were the long-awaited low-end color workstation, the Sun-3/110LC, and the Sun-3/200 high-end series, which boasts a rating of 4 million instructions per second (MIPS) and is based on the new Motorola, Inc. 68020 microprocessor that has a clock speed of 25 MHz. The systems are expected to ship within 90 days of order, the vendor said.



| | 3/110 LC (low-cost color) | 3/200 Series |
|---|---|---|
| Memory (Bytes) | 4M to 12M | 8M to 32M |
| Disk Capacity (Bytes) | 71M to 142M | 280M to 1.1G |
| Base Price[2] | $15,900 | $33,900 |

**Not alone**

However, Sun will not be alone in the spotlight for long. Apollo Computer, Inc. said it will make a high-end announcement this week. Also, Digital Equipment Corp. said late last month that it would be introducing workstation-related products this month; it has also been rumored that DEC will ship a low-end workstation by year's end. Additionally, Silicon Graphics, Inc. and other vendors have scheduled a number of announcements for the Association for Computing Machinery's Siggraph computer graphics show, which will be held next week.

"Sun is ahead now, but Apollo and the others will catch up," said Vicki Brown, senior analyst at International Data Corp., a market research firm based in Framingham, Mass.

But Sun's full range of offerings is expected to strengthen its position in the workstation market, analysts said. It now has a complete line of products, from the very low end with a diskless monochrome system that costs $7,900 to a high-end system that can support up to 48 users and starts at $33,900.

Sun also cut an average of $3,000 from the price of each of its 3/75 and 3/160 series mid-range workstations. It will also offer a $19,900 CPU and memory package to upgrade the 3/160s to the 3/200 systems.

In addition to the hardware offerings, Sun introduced its new operating system, Sun OS 3.2, which is the result of a team effort between it and AT&T to merge the features of both the academically oriented Berkeley 4.2 version of Unix and the more business-oriented System V version from AT&T. The operating system will be released in two phases, the first of which is available within 90 days of order.

Phase I is based on the Berkeley 4.2 version with 4.3 enhancements and includes some of the systems calls, library routines and commands of System V. Phase II, scheduled for shipment in the second half of 1987, will reportedly provide complete System V Interface Definition compatibility, including the System V terminal driver interface.

According to Sun, Phase I has "minor differences" between 4.2 and System V. The functions that have not yet been merged are handled by providing the 4.2 capability in a default location and the System V functions as separate directories or libraries. A user can select the preferred environment and write programs for either 4.2 or System V.

**Superior because of true merging**

Sun claims that Sun OS 3.2 is superior to Apollo's version of System V and Berkeley 4.2 because it is a true merging of both, whereas Apollo's is two separate operating environments residing on the same system. An Apollo spokesman said he had not reviewed the new Sun operating system closely enough to comment on it.

The Sun-3/110LC color workstation, with a base price of $15,900, will compete directly with Apollo's Series 3000 color system, which has a starting price of $16,900, and the IBM RT Personal Computer, which starts at $16,485.

The Sun-3/200 series will compete with high-end offerings from both Apollo and DEC. Its base price of $33,900 is competitive with the pricing of both the DEC Vaxstatioo II/GPX series and the Apollo DN 570 and DN 580 models, but its 4-MIPS rating is more than double that of the DEC and Apollo systems.

The Sun high-end series will be offered in three desk-side versions: the 3/260HM monochrome model, the 3/260C color model and the 3/260G gray-scale model, each with a 19-in. monitor. The monochrome version has 1,600- by 1,280-pixel resolution, and the gray-scale and color models have 1,152- by 900-pixel resolution.

Each of the 3/260 models includes a 20-MHz Motorola 68881 floating-point coprocessor. An entry-level system includes 8M bytes of main memory, a 12-slot card cage, Sun OS 3.2 and associated systems software.

Main memory is expandable to 32M bytes and will be sold in 8M-byte increments at a cost of $12,000 each.

**Monochrome version**

The monochrome version, with a 280M-byte disk drive and 60M-byte, ¼-in. tape, costs $51,500; a similarly configured gray-scale versioo costs $58,500, and the color version costs $62,500. For an additional $10,000 per system, another 280M-byte disk drive can be added.

The 3/110LC is based on a 16.67-MHz Motorola 68020 chip and a 16.67-MHz 68881 coprocessor. It can display up to 256 colors simultaneously.

The 3/110LC comes with a 15-in. monitor, 4M bytes of main memory expandable to 12M bytes, an Ethernet interface, two RS-423 serial ports and a VMEbus interface. A system with a 71M-byte disk drive costs $21,900, and a system with a 142M-byte disk drive, the maximum configuration, costs an additional $4,900. The gray-scale version has the same entry-level price of $15,900, while the color version starts at $19,900.

The company will offer file servers based on the 3/200 models; pricing starts at $31,900.

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**New Dimensions in Software Productivity.**

# AI's commercial impact is focus of science group's show

## Meeting to separate science, engineering

By Eddy Goldberg

PHILADELPHIA — When the largest trade show for artificial intelligence, AAAI-86, opens today, a new goal will be added to its traditional charter. Rather than just disseminating pure AI research, organizers hope to demonstrate the evolution of research into commercial applications.

The Fifth National Conference on Artificial intelligence will take on a more practical air, according to observers and its sponsor, the American Association for Artificial Intelligence (AAAI).

"AAAI is a scientific society that for years has been concerned with the release of theoretical findings in AI science," said Claudia Mazzetti, executive director of AAAI. However, she added, "AI is only a concept until it's applied."

"I like the fact that the technical program is restructured to include more practical applications," said Lou Giacolone, editor of "Knowledge Engineering," a New York-based newsletter.

Intel Corp. will likely make a splash at the show with its 80386 chip and products based around it, said Harvey Newquist, editor of "AI Trends," a Scottsdale, Ariz.-based oewsletter.

Also, Intel Scientific Computers will demonstrate a research version of Concurrent Prolog running on its IPSC line of computers.

Gold Hill Computers, Inc. is expected to make three announcements at the conference, including an Intel 80386-based plug-in board (see story page 19).

Although large firms like Control Data Corp., Digital Equipment Corp. and IBM dominated last year's conference news [CW, Aug. 19, 1985] with major product announcements, Newquist said he thinks they will be at this year's show mainly to assure attendees of their continuing interest in the AI field.

Nevertheless, Jonathan D. Lynch, publisher of the "Applied Artificial Intelligence Reporter," a newsletter from the University of Miami, said he expects "a lot of product announcements, as the upward curve of interest continues" in the AI field.

A late withdrawal from the show is Sperry Corp., which reportedly did not have its product ready.

Texas Instruments, Inc. is expected to announce the Explorer LX system. The multiprocessor workstation will combine the Explorer LISP processor with a 16.67-MHz Motorola, Inc. 68020-based coprocessor. The Explorer LX will be available in December and will cost $73,900 in a base configuration.

Aion Corp. of Palo Alto, Calif., is set to introdoce AES/MVS and AES/VM, MVS and VM versions of its Application Execution System for IBM mainframes. Also, Aion reportedly will announce ADS/VM, a version of its Application Development System for IBM VM operating systems.

# *Add-in boards: Solution overload*

From page 1

boards to connect PCs to an IBM System/38, a board product from one of the most prominent vendors failed, he says.

To use that particular board, Strayer would have had to install extra software on the System/38. He was desperate. "The DP manager said, 'Get out of here. You're not putting all that stuff on my system,' " he recalls. in Strayer's opinion, the vendor had made the mistake of putting an unfinished product on the market. Fortunately, Strayer says, Ideassociates, Inc. was able to provide a product that did not require software installation oo the minicomputer.

In choosing systems, a majority of managers stick with the more prominent, proven vendors, such as IBM, Compaq Computer Corp. and Tandy Corp., according to various spending surveys. That rule of thumb also applies to add-in board purchases, where companies like IBM, AST Research, Inc. and Hercules Computer Technology control a sizable share of the market (see chart page 1).

Expanded memory, the most typical user demand, is usually offered on boards carrying other features like extra serial ports. Depending opon configuration, a multifunction board with a corporation's desired features may retail for $800. Thus, even with a typical 25% discount, the microcomputer manager wishing to upgrade 100 PCs is faced with a $60,000 decision.

According to several estimates, about $1 billion worth of microcomputer add-in boards will be sold by vendors other than IBM this year. Fortune 1,000 corporations should account for about half of those purchases, estimates John McCarthy, research manager at Forrester Research, Inc. in Cambridge, Mass.

Because they usually purchase add-on products in large quantities, companies sometimes have the option of saving a little extra by buying directly from the vendors.

### Going through dealers

But many managers, like Strayer, prefer to go through dealers. Strayer gives three reasons: The dealer gives lots of advice, the technical support from a dealer is usually better and quicker and, for accounting purposes, it is easier to track and report purchases from one company instead of many. By going through a dealer, Strayer still receives hardware discounts as high as 28%.

While some of the larger firms like Quadram Corp. have their field sales forces call on user customers, they often make joint calls or refer potential clients to dealers. This avoids alienating the dealer base, explains Cynthia Ringo, manager of Quadram's board products division.

Whether going directly to the vendor or through dealers, many micro managers and consultants shy away from IBM's products whenever possible. They say IBM charges higher prices and offers slower delivery than competing vendors.

But Ed Macke, who manages approximately 390 IBM Personal Computer XTs and ATs at Northrop Defense Systems Division in Chicago, is very pro-IBM. "If you go away from IBM, you risk being cut off at the pass at some point in the future," he says, "because you've got to be ensured of compatibility with the IBM PC standard."

If Macke does have to choose from an independent vendor, he sticks with the well-known names. The issue with non-IBM companies is "not only whether they are going to stay around, but how well will they be able to maintain compatibility. If IBM makes a change, I need a company that has money behind it that can afford to immediately try to catch up with that change. John Doe's Basement can't do that."

In Macke's experience, trying to match different vendors' products within a single system can be extremely trying. Macke has seen hard disk drives clash with emulation boards, PC network boards and color graphics adapters. "It's a real zoo," he says.

According to the president of one of the lesser known board companies, too many managers feel pressured to buy add-in boards on the basis of name recognition, rather than price and performance. "Rather than buying on price and performance, they'd rather take the path of least resistance," says Tim Farris of Boca Research, Inc. in Boca Raton, Fla.

"By getting brand-name products and paying more, they feel that they will get less flak," he adds.

Founded just more than 1½ years ago by Farris — who cofounded Quadram in 1981 — Boca Research makes memory and multifunction boards. Memek, one of its chief products, combines several functions, including expanded memory and graphics card emulation, all on one board.

"The interesting thing here is that we buy the same components as IBM, and the same factory that assembles our boards does work for IBM," Farris notes.

"It is virtually impossible to stay abreast of everything, but if something sounds interesting, we will bring it in [for evaluation] whether it's from a small company or not," says Danielle Barr, vice-president of corporate systems at the Bank of New England in Boston.

Barr often obtains boards from either dealers or vendors for 30-day evaluations. She advises other managers to document those evaluations well and make them accessible to others. "You've got to have some kind of central reference," she says.

While the smaller vendors continue to struggle for recognition, even the key companies have been experiencing hard times lately. After laying off 7% of its work force, market leader AST Research last month reported sales and earnings declines in its fourth quarter. Tecmar, Inc., which at one time offered more than 70 board-level products, is in the process of being acquired by holding company Rexon, Inc.

### Intense competition

The intense competition for add-on boards was definitely a major cause of Tecmar's woes, according to Whitney Lynn, interim marketing vice-president. Tecmar's product repertoire will be "streamlined" so the company can concentrate on graphics boards and tape drives, Lynn explains.

One consultant who helps companies set up information centers maintains that in some cases, choosing products from lesser known companies can be a safe proposition. In micro-to-mainframe links, it is best to stick with tested products like Digital Communications Associates, Inc.'s Irma and boards from Pathway Design, Inc., advises Dan Ryan, a senior associate at the Boston Systems Group, Inc. in Boston.

Because expanded memory boards are so new, and because there are two competing standards, choosing no-name brands can be too risky, according to Ryan. But with conventional memory and multifunction boards, most companies' products are straightforward and reliable. "A serial port is a serial port," he says. "If you can find somebody who gives you an extra 128K and an extra serial port for the same price, then you might as well go for it."

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# Five years old, modified IBM PCs still remain on the job

## Options power up old technology, but market problems hit Big Blue

By Douglas Barney

Five years after the announcement of the IBM Personal Computer, a debate rages over the usefulness of the original technology.

For many, the IBM PC is obsolete, and they will settle for nothing less than an IBM Personal Computer AT or compatible with the more powerful Intel Corp. 80286 microprocessor. Others gnash their teeth in anticipation of a micro based on the powerful Intel 80386 microprocessor.

But for some, even the original PC, with a few enhancements of course, does the job. "I've got one that originally came with the 16K bytes of random-access memory and cassette port, and I use it still," says Colin Kuskley, director of training and a principal of the Center for Advanced Data Processing in New York. Kuskley has enhanced the machine with new disk drives and more memory, but he claims the machine runs all the current software and remains useful.

The introduction of hard disk drives that fit into one of the PC's expansion slots and accelerator boards that boost its speed to the rate of an IBM PC AT have also helped to keep the PC competitive with newer machines.

"The initial target for the hard disk device was the old full-height IBM PCs," says Ian Warhaftig, International Data Corp. (IDC) senior market analyst in its storage products program. IDC anticipates that 230,000 of these devices will ship this year, with many of them going into the older floppy disk-based PCs.

Many corporations still buy what amounts to the original IBM PC with a hard disk drive. "We buy more Personal Computer XTs or XT equivalents than anything else. The hard disk is more important to us now than the faster (80286) processor," says R. Bruce Johnson, manager of the personal computer resource center at Deloitte Haskins & Sells. "There are even some employee situations where they are buying just a floppy-based machine," Johnson says.

In spring of 1985, IBM announced a floppy disk-based version of the PC XT with a PC XT motherboard that allows the machine to be more easily outfitted with a hard disk drive. This machine costs little more than the PC and has effectively stopped plain vanilla PC sales dead in their tracks.

**ANALYSIS**

Many viewed the 1984 introduction of the IBM PC AT as the end of the road for the IBM PC. But the lack of an operating system that unleashes the full power of the AT class of machines has kept the Intel 8088-based machines in the running, a situation that many lament. "It is 5 years old, and we are reminded that we are still basically within the same boundaries," says William F. Zachmann, vice-president of research for IDC.

### Sales exceed projections

IBM has clearly dominated the market for personal computers and claims to be surprised by its early success. "IBM made projections that it would sell so many [PCs] in the life of the machine, and they blew those projections out of the water in the first year," says Fred McNeese, an IBM spokesman.

But success has not always come so easily, even to IBM. When it introduced the IBM Portable Personal Computer, expectations ran high. Due to poor sales, however, the machine was withdrawn from the market to the delight of Compaq Computer Corp. fans everywhere.

The failure of the IBM PCjr to create the much heralded home market was well documented, and IBM announced it was discontinuing manufacturing in March 1985.

And even the PC line, with its open and imitable architecture, has had its share of problems lately. Low-cost clones of the IBM PC have cut into IBM sales.

Indications show that this competition will only get worse as the low-cost leaders are supplanted by lower cost marketers. "The PC has now been turned against IBM," notes Bill Coggshall, president of Market Access International, Inc., a San Jose, Calif.-based research firm.

The challenge for IBM goes beyond battling the clones with a much-rumored low-cost "clone killer." The real challenge is to repeat the success of the PC with a new generation of products based upon the 80386 chip.

"A leader has to obsolete itself. IBM will have to self-obsolete before others obsolete it," Coggshall says.

With Compaq publicly committed to beating IBM to the 80386 punch, the challenge for IBM may be enormous. There is little doubt, bowever, that IBM's sleeves are big enough to hold a few aces.



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NEWS from page 1

sidiary. A company spokesman denied, reports that transfers may number up to 1,000 and may, in some cases, be involuntary. "There is some redeployment involving Rolm, but the number is significantly lower than 1,000, and it's on a voluntary basis," IBM spokesman Jim Burke said.

Mike Farrell, president of the Delaware Valley users group, an organization of System/34, 36 and 38 users, suggested that economies of scale resulting from the convergence of the System/36 and 38, as announced by IBM in June, are the probable cause of the cutbacks. But George Colony, president of Forrester Research, Inc., a Cambridge, Mass., consulting firm, asserted that System/36 sales are not meeting IBM goals.

■

**Data General will announce three-dimensional,** computer-aided design and manufacturing software and a processor at the Boston Computer Museum on Tuesday. Also on Tuesday, Burroughs will announce new capabilities for some of its office automation systems, including communications capabilities aimed at IBM mainframes.

■

**A Federal Communications Commission mandate** will cause AT&T and local phone companies to lower their rates by $1.2 billion in 1987 and 1988. The commission reduced the profitability limit it sets on what AT&T Communications and local telephone companies may earn on interstate calls in those years. As a result, AT&T said it will make price cuts averaging 2% to 3%. The FCC pointed to lower inflation as a cause of the reduction, which it will reconsider in two years.

■

**On Aug. 19, Digital Communications Associates, Inc.** will announce several additions to its line of Irma personal computer communications products. The announcements involve "new dimensions in token-ring workstations applications" and mainframe graphics capabilities for PC users. Observers expect the token-ring announcement to be a local-area network-to-mainframe communications product.

# Doubts surround Mac Dbase plan

From page 1

upon us at this point," said Dick Webb, audit partner with Peat, Marwick, Mitchell & Co., an accounting firm in New York that has approximately 6,000 Macintosh computers and uses Microsoft Corp.'s MS File as its data base.

Last year Lotus Development Corp. announced Jazz, an integrated package heralded by some as the 1-2-3 for the Macintosh.

But sales of Jazz never took off and did not noticeably boost business sales of the Macintosh. Microsoft's Excel, an integrated product launched last year, has enjoyed more success, however.

The very nature of Dbase may make it a difficult sell on the Macintosh. A key strength of the Macintosh is its ease of use through icons, the mouse and menus. The traditional strength of Dbase, on the other hand, has been its programming language, which must be mastered in order to use the advanced capabilities of the software.

**May use more icons**

But some sources argue that the product will make extensive use of the Macintosh's icons and menus and will therefore be easy to use. Ashton-Tate last week declined to be interviewed concerning today's product announcement.

"I don't see that there would be anything significant about Dbase to make us change from the MS File. It would not be worthwhile to bring all our users up to speed on the full capabilities of something like Dbase," Webb said.

"It certainly makes it a more credible machine," said Rick Richardson, national director of microcomputer technology for Arthur Young, based in New York. But, he added, Ashton-Tate "will have its hands full" competing against "the very powerful" Omnis III data base package from Blyth Software, Inc.

Analysts interviewed tended to be more positive than users. According to Jeffrey Tarter, publisher of "Softletter," a Cambridge, Mass.-based newsletter, the Macintosh has come into enough corporations "through the back door," that it has become somewhat of a second standard for personal computing.

Although Tarter said he has seen the product, he declined to verify that it was Dbase or provide specific details.

"It certainly won't do any harm. There hasn't been an outstanding data base for the Mac to this point. It is probably a plus for the world of the Macintosh," said William Zachmann, vice-president of research for International Data Corp.

A member of Ashton-Tate's user advisory board discounted speculation that the group had convinced the company to move into the Macintosh market.

"Macintoshes are used in those companies in very restricted, specialized areas. I don't think the corporate advisory board has pushed them into the Macintosh market," said R. Bruce Johnson, manager of the personal computer resource center for Deloitte Haskins & Sells, a New York-based accounting firm. "I am not going to buy it, because I have an IBM standard that we have to maintain internationally."

Despite the lack of acceptance of the Macintosh at Deloitte Haskins, Johnson says he believes the Ashton-Tate product will expand the market for the Macintosh in large corporations. "One of the things that kept the Mac from acceptance in the corporate market is the lack of business applications."

The market for Macintosh data base products is heating up. Borland International, Inc. late last month acquired Singular Software, Inc. and has repriced the firm's $195 Interlace data base to $99.95.

Blythe Software this week will announce an enhanced version of Omnis III. Ashton-Tate also faces Helix, a sophisticated data base package from Odesta Corp.

# MS Works to lead Macworld debuts

**By Peggy Watt and Douglas Barney**

BOSTON — Several major products for Apple Computer, Inc.'s Macintosh will debut at the Macworld Exposition this week.

Most significant among the products is the expected release of MS Works, an integrated package from Microsoft Corp. that includes financial modeling, word processing, data base and telecommunications.

General Computer Co. of Cambridge, Mass., will introduce its $1,199 Hyperdrive FX/20, an external 20M-byte hard disk drive for the Macintosh.

National Instruments Corp. of Austin, Texas, will introduce Macbus, a $1,495 programmable I/O processor that can connect with personal computer cards, and Labview software, an engineering workbench for developing custom instrumentation systems.

Several introductions will center around desktop publishing, and include Aldus Corp.'s Fontastic Fonts, which are two fonts for both the Apple Laserwriter and Imagewriter printers, Adobe Systems, Inc.'s 10 font packages for its Postscript printers and Ergotron, Inc.'s Mac Buffer, a server for the Laserwriter.

Other products to be announced include 20/20 Combo, a 20M-byte hard disk drive and tape backup combination from Lodown, Inc.; Filemaker Plus from Forethought, Inc.; Macback Plus and Macport Plus from Peripheral Land, Inc.; and Promodem 2400 from Prometheus Products, Inc.


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# DEC launches two mid-range VAXs, direct assault on IBM

## Products solidify line, open markets for firm

By Donna Raimondi

BOSTON — Digital Equipment Corp. last week launched its most direct attack yet on traditional IBM markets as it announced two mid-range VAX minicomputers and related products.

The products did not represent a technical departure from other VAX series computers. Their importance, DEC officials maintained, was in filling out DEC's VAX line, permitting the company to pursue customers in insurance, banking, aerospace, automotive and other markets traditionally considered IBM captives.

"This is more than a ho-hum announcement of two more VAXs," said International Data Corp. analyst Richard Mikita. "The combination of new machines, repricing and emphasis on the VAXBI interface is important for DEC's overall strategy. They more directly contrasted IBM and DEC this time," he said.

Among the introductions last week were the VAX 8550 and 8700 models, VAXBI bus-based configurations of VAX 8200 and 8300 systems, a terminal server, memory enhancements for older VAX products and a bridge to allow the 8600 and 8650 processors to access the VAXBI bus technology. Most of the enhancements and products were designed to bring various systems into line with the VAXBI bus scheme and with DEC's clustering facilities.

The VAX 8550 is a general-purpose system that could serve large departmental office systems, simulation or computer-aided design. The 8700 model — similar to the 8550 in processor performance — is closer to the VAX 8800 in size and is said to be better suited for high-speed data collection, artificial intelligence, financial modeling and very large simulation programs, DEC said.

DEC stated that its compatible VAXs, Vaxclusters and related products are ready to take over in shops that are traditionally all IBM. "Their challenge here will be an educational one, to get that message across to MIS managers," IDC's Mikita said.

Robert Hughes, DEC's vice-president of industry marketing, compared DEC's strategy of compatible systems, networking abilities and standardized software to the development of planned, standardized highways. IBM's Binary Synchronous Communications protocol is like an old two-lane road, he said. Its separate operating systems on different-size systems and its separate staffs necessary to direct operations of dissimilar architectures mean that IBM customers often have to go the long way to get where they are going.

The recently announced VAX 8550 — with almost two times the performance of its companion system, the 8500 — comes in a 27-in.-wide cabinet similar to the 8500's. DEC plans to offer an upgrade kit for an 8500-to-8550 conversion in the near future.

The 8550 offers I/O speeds of up to 16M byte/sec. Memory starts at 20M bytes and ranges to 80M bytes. A building block system costs $364,000 and includes 20M bytes of memory, the Ethernet networking capability, a four-port disk controller, one year of VMS and Decnet software licenses and a one-year, on-site hardware warranty.

### Other configurations

Other configurations include a $378,000 Vaxcluster building-block system; a $398,000 VMS preconfigured system with an RA81 456M-byte disk drive, a TU81-Plus streaming tape drive and controller and a DMB32 multifunction communications controller; and a $441,000 office automation system with 48M bytes of memory, Ethernet, a KDB50 four-port disk controller and one-year licenses for VMS, Decnet and All-in-1 office automation software.

The 8700 systems start with 32M bytes of main memory and range to 128M bytes. The 8700 delivers the same I/O and memory capacity as the high-end VAX 8800 but has the same processor performance as the VAX 8550, DEC said. The 8700 comes in a large cabinet that allows connection of up to four VAXBI interface I/O channels for an aggregate bandwidth of up to 30M byte/sec. of I/O traffic. An 8700-to-8800 board addition upgrade kit will be available in the fall and has not been priced yet, DEC said.

DEC also announced native VAXBI configurations of its 8200 and 8300 systems that range in price from $79,000 to $127,000 for the 8200 and from $109,000 to $157,000 for the 8300. It released 16M-byte memory array expansion packages ($48,000) for the two new systems and 4M-byte memory arrays ($12,900) for the 8200 and 8300.

The Decserver 200 terminal server connects up to eight terminals, printers or modems to an Ethernet local-area network. The 200/MC model costs $3,450 and implements eight RS-232C asynchronous lines for terminal and printer connections, modem control and access to non-DEC systems. The 200/DL model costs $3,050 and provides eight ports for terminal and printer connections only.

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Oracle Corporation President Larry Ellison said, "We are very excited about this agreement, and are 100% committed to making our relationship with IBM an enourmous success. we have always worked hard to maintain compatibility with IBM's DB2 and SQL/DS products."

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# Net to test compatibility

From page 1

oped by the International Standards Organization.

The first test to be conducted on the network, scheduled for Sept. 1, will determine system interoperability using the OSI file transfer access method (FTAM).

The OSInet project is one of the first carried out in cooperation with the Corporation for Open Systems (COS), a user and vendor organization recently founded to coordinate and provide direction for OSI standards development and testing efforts.

> ***'OSInet will enable us to resolve most interoperability problems with other vendors before our products reach the user.'***
>
> — Steven Wendler
> Digital Equipment Corp.

"We fully expect that test protocols developed on OSInet will be transferred to COS," said Steven Wendler, OSI marketing manager for Digital Equipment Corp. The "National Bureau of Standards is in the business of developing test procedures, while COS's job is to run the tests. I would predict that OSInet will accelerate COS's efforts at setting up test beds," Wendler said.

"There are any number of ways to implement an OSI layer," noted John Haefner, chief of the systems and network architecture division at the National Bureau of Standards (NBS), one of the project's charter members.

"Different vendors' products may not be compatible, even though they all use the same OSI design specifications. An example of this is packet-switching networks that all use X.25, but still cannot exchange data. OSInet is designed to avoid this nonsense," Haefner said.

Vendors who are charter members of the OSInet joint development committee include DEC, AT&T, IBM, Amdahl Corp., Boeing Computer Services Co., Hewlett-Packard Co., Sperry Corp./Burroughs Corp., Wang Laboratories, Inc. Honeywell, Inc. and UK computer manofacturer ICL PLC.

"OSInet will enable us to resolve most interoperability problems with other vendors before our products reach the user," DEC's Wendler said.

"It also provides a way for us to demonstrate OSI communications for skeptical customers who have heard about the standard without seeing anything solid for too long," he said.

Among-user organization charter members are the U.S. Department of the Navy, the Defense Communications Agency and the U.S. Department of Agriculture.

One of the network's first projects will be a joint development effort by the NBS and the Department of Defense (DOD) to develop and test gateways between curent DOD protocols and OSI.

The Defense Communications Agency plans to use OSInet facilities to help it evaluate prodocts that may enable the DOD communications protocols to communicate, or even merge, with OSI standards, a Defense Communications Agency spokesman said.

Boeing will be one of eight participants in the FTAM interoperability test scheduled for next month. "Boeing has been involved with OSInet since its inception," said Laurie Bride, Manufacturing Automation Protocol/Technical Office Protocol (MAP/TOP) program manager at Boeing.

The aerospace company's own OSI testing facilities are already linked to OSInet via an X.25 packet-switching connection.

"We currently have systems from more than a dozen vendors linked on a MAP/TOP network; OSInet will allow us to test interoperability with a broader set of vendors," Bride noted.

The OSInet project will be coordinated with the efforts of other standards organizations such as NBS, the MAP/TOP Users Group and COS, Haefner said.

The OSInet organization plans to "work closely with COS in order to avoid duplication of effort," he said. "Then we'll be right where we want to be, with everyone solving a piece of the puzzle." Most vendors that have joined OSInet are also members of COS.

The project has a target number of 100 organizations participating in the network by early 1987, Haefner said.

A January 1987 deadline has been set for all 25 charter members' systems to be communicating over OSInet.

The "only comparable instances of such widespread vendor cooperation were the OSI internetworking demonstrations that took place at Autofact '85 and National Computer Conference '84," Wendler said.

"But those were temporary; these facilities will be available ongoing, and represent a much bigger vendor commitment," he added.

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# HP to adopt Imagen DDL for Laserjet, enhancing desktop publishing ability

By Maura McEnaney

PALO ALTO, Calif. — Hewlett-Packard Co. is scheduled this week to announce plans to incorporate Imagen Corp.'s DDL page description language as the composition language for its Laserjet line of printers.

The announcement should end speculation about HP's plans for enhancing its desktop publishing capabilities, which have been limited by its lack of s powerful page description programming language. Until now, HP has been using its own Printer Command Language (PCL), an instruction set that controls features of Laserjet.

Whereas PCL was designed to take advantage of Laserjet features and emphasize the compatibility of HP's printer line, Imagen's DDL addresses entire document layouts. It also allows pages to be created in any order and images to be easily repositioned.

"HP would like to have a stronger product for the desktop publishing market," says Cathy Dingman, an analyst at market research firm CAP International, Inc., in Marshfield, Mass. "Once they have a product with a page description language, they will have s product for desktop publishing," she says.

Under the terms of the agreement to be announced today, Santa Clara, Calif.-based Imagen will license DDL to HP. Laserjet products incorporating DDL will not be available until the fall, notes Chuck Ulfers, marketing manager for HP's Boise division in Idaho. HP will still support PCL, he says, because "we still believe the sverage user of a laser printer is not into desktop publishing."

There was some speculation earlier this year that HP would incorporate page description language functions into a new version of PCL; however, that is no longer necessary, Ulfers says. HP selected Imagen as the vendor of the page description language because it is highly compatible with HP's line of printers and is oriented more toward producing entire documents than market leader Adobe Systems, Inc.'s Postscript, used in Apple Computer, Inc.'s popular Laserwriter printer, he explains.

"It gives HP the wherewithal to compete with Apple without having to sell the Apple Laserwriter," says Jose Ramos, publisher of "WYSIWYG" newsletter in Redwood City, Calif.

With more than 500 independent third-party software vendors supporting PCL on its printers, HP will not have trouble attracting vendors to DDL, CAP's Dingman claims. Page composition software vendors that have committed to DDL include Aldus Corp., Lexisoft, Inc., Microsoft Corp., Software Publishing Corp. and Studio Software Corp.

# Cray boosts low-end power

## Cuts prices, bolsters power on older models

By Donna Raimondi

MINNEAPOLIS — Cray Research, Inc. last week announced new low-end supercomputer models as well as price reductions and a boost in CPU performance on existing models.

The Minneapolis vendor released a $12 million X-MP/44 system with four CPUs that share s four-million-word (64-bit words) emitter-coupled logic (ECL) bipolar memory arranged in 32 interleaved banks. The system ls the smallest four-processor model that Cray makes, a spokeswoman said. Other X-MP/4 machines have eight- or 16-million-word memories.

The new $7 million X-MP/22 system has two CPUs sharing two million words of metal oxide semiconductor (MOS) memory arranged in 16 interleaved banks. This model is the entry-level, dual-processor model, the Cray spokeswoman said. Other models in the X-MP/2 series have four-, eight- or 16-million words.

"The demand for Cray machines is strongly in favor of dual- and quad-processor systems, so the new products and the price adjustments are just an effort to boost the low end of those lines," said supercomputer analyst Jeffrey Canin of the investment firm Hambrecht & Quist in San Francisco. In the past, Cray has paid more attention to the high end of its line, in which customer demand is strongest, he added.

Cray's low end is in need of filling out, and this announcement appears to address that need, according to Canin. The most powerful supermini-computer from the so-called Crayette companies — Cray-compatible vendors in a lower range — reaches only about one-third the power of Cray's entry-level, single-processor XM-P system. Cray has explored and rejected any systems in the supermunicomputer range, so the move does not appear to be competitive with the Crayettes, Canin said.

Prices on all one- and two-processor X-MP systems have been reduced. The single-processor X-MP/1 series machines' prices were slashed $1 million, and from $500,000 to $1 million came off the dual-processor models' prices. The prices of the X-MP/4 systems that use ECL bipolar memory have hot been reduced because prices of ECL memory have not fallen, the Cray spokeswoman added.

The increase in CPU performance is owing to s speedup of the X-MP clock period to 8.5 nsec from 9.5 nsec, a move Canin called a "mid-life kicker" for older systems. This was possible because of chip replacements in both the CPU and memory, the spokeswoman said. All new systems, which are compatible with the older systems, now incorporate the faster clock time.

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# NAS elbows into high-end vector processing competition

## Enrolls AS/XL in IBM 3090 class

By Eddy Goldberg

MOUNTAIN VIEW, Calif. — Stressing an ongoing commitment to engineering and scientific users, National Advanced Systems Corp. (NAS) last week announced the AS/XL Vector series of mainframe processors, priced in the $3.5 to $15 million range, as well as four third-party software packages.

The processors are pitted against IBM's 3090 Vector Facility and Amdahl Corp.'s 5890 mainframes.

NAS also announced the fourth-quarter 1987 release of 3090 VF Extend, a proprietary firmware feature that will give AS/XL Vector users the ability to run programs compiled for the 3090 Vector Facility.

"They've basically reannounced the AS/XL with a vector processor bundled into it," said Tom Henkel, an analyst with the Yankee Group. "IBM will probably do the same in September."

"The interesting thing about this announcement is that NAS usually competes with IBM in the mid-range. This is the first year they have started competing with Amdahl and IBM's 3090-class systems," said Jeffry Canin, supercomputer analyst at Hambrecht & Quist in San Francisco.

Henkel said IBM will ship an estimated 200 Vector Facility systems by the end of this year.

NAS said full operating system compatibility with IBM's 370 and 370 Extended Architecture will be provided in the AS/XL Vector series, which will run engineering and scientific applications in the MVS, MVS/SP, MVS/XA and VM/HPO environments. The vector systems will also provide upward compatibility for software developed on NAS AS/9100 series processors.

The uniprocessor Model V60 and dyadic Model V80 are scheduled to be available this October. A smaller uniprocessor Model V50 has a planned release date of first-quarter 1987, and the three-processor Model V90 and four-processor Model V100 are slated for third-quarter 1987 releases.

Software supported for the NAS vector systems includes: MSC/Nastran, a finite element-method software package from MacNeal-Schwendler Corp. in Los Angeles, available now; and the NAG Fortran Library from the Numerical Algorithms Group in Downers Grove, Ill., available in third-quarter 1987.

Other software includes Vector and Array Syntax Translator/Extended, a Fortran program preprocessor that converts scalar applications into vectorized code and provides portability and compatibility between 3090 Vector Facility applications and the AS/XL Vector Series, developed jointly with Pacific-Sierra Research Corp. in Los Angeles and available now; and Math Advantage, a mathematical library of core numerical algorithms from Quantitative Technology Corp. of Beaverton, Ore., also available now.

The Vector series features an internal storage hierarchy consisting of main storage, dynamic working storage and a cache buffer. Dynamic working storage, with an average access time of 12 nsec, comes in 512K-byte, 1M-byte and 2M-byte increments.

Located between the cache buffer and main storage, dynamic working storage provides additional access to faster chips for data and instruction fetches, according to Claude Steinmayer, director of worldwide scientific computing for NAS. He said access time in cache is 4.5 nsec, compared with 120 to 150 nsec in main storage.

He also noted the AS/XL Vector series is air-cooled and has a footprint one-third to one-half the size of comparable IBM 3090 vector processor configurations.

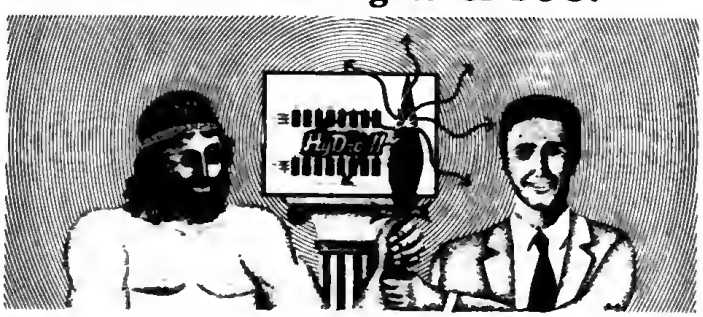
In terms of performance, Steinmayer cited an August report from the Argonne National Laboratory in Lemont, Ill., that shows Linpack, a public-domain software library consisting of software routines with a high percentage of floating-point operations, ran on the AS/XL Model 60 uniprocessor at 43 million floating-point operations per second (MFLOPS); the IBM 3090 Model 200 uniprocessor with one vector facility ran the Linpack at 15 MFLOPS, Steinmayer said.

Pricing for the AS/XL Vector Series is $3.61 million for the V50, $4.79 million for the V60, $8.01 million for the V80, $11.26 million for the V90 and $14.24 million for the V100. The 3090 VF Extend will have a one-time fee of $50,000.

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# World Digest

## NCR promises more

HONG KONG — NCR Corp. recently indicated to users in Hong Kong that extensions to its 9800 series of fault-tolerant, general-purpose mainframes will be released, along with a full line of banking software, toward the end of this year.

Though no specifications were revealed, a spokesman did confirm that the software will include data bases, fourth-generation tools and Cobol-based products.

An automatic teller machine, dubbed the 5841, and a banking terminal based on NCR's Tower microcomputer will also be launched in the fourth quarter. The terminal will run under Unix and/or a new transaction operating system, the spokesman said.

NCR made the unofficial announcement to users in an effort to hold its ground against IBM in the financial sector of Hong Kong. Prior to the April announcement of the 9800 series, NCR suffered a spate of user defections to Big Blue.

NCR financial services manager Mike Darch admitted that if the company had been able to launch the machine earlier, "it would have made those banks' decisions a lot harder to make."

Underscoring the point, the Belgian Bank in Hong Kong has reversed its decision to migrate from an NCR 8500-based banking system to IBM, on the strength of the recent NCR announcement. In a deal valued at $350,000, the bank has contracted to purchase a two-application processor 9822 with two data storage units.

— Francis Pearce

## Plessey takeover bid barred

LONDON — A bid by General Electric Co. PLC (GEC) to reshape the UK electronics industry by taking over its rival Plessey PLC has failed. After eight months of heated debate concerning the wisdom of creating a British company with combined revenue of $11.1 billion, Paul Channon, secretary of state for trade and industry, last week came out against the move.

GEC's bid for Plessey was referred to the Monopolies and Mergers Commission in January, a body that polices corporate mergers in the UK. The commission's report, published recently, rejected GEC's overtures. Channon accepted its finding that the takeover would operate "against the public interest."

Plessey, which reportedly fought hard and sometimes acrimoniously with GEC, welcomed the outcome. However, a dispute is brewing about the future of System X, a digital public switch developed by Plessey, GEC and STC PLC, its original developer. Although the commission has rejected an overall merger, it supports the rationalization of the joint development. Both GEC and Plessey manufacture and sell the system, with Plessey taking the leading role.

"GEC has argued for many years for reorganization of the UK's activities in the public switching field," commented James Prior, GEC chairman. "Since GEC made its offer to Plessey, it has been recognized that this can only be accomplished by the combination of GEC's and Plessey's interests in public switching and associated transmission businesses."

Plessey, which replied to GEC's takeover bid in December last year with an offer to take System X off its rival's hands, declared, "We shall continue to run our profitable and successful System X business." Plessey rejected any suggestion that GEC should buy System X and said that it had been trying, unsuccessfully, to reach agreement with GEC on a joint venture for the switch since 1982.

— John Lamb

## IBM PC grip slips in UK

LONDON — IBM's grip on the UK personal computer market slipped in the first six months of this year as competition from IBM-compatible suppliers intensified. According to market analyst Romtec Ltd., in the last three months of 1985, IBM accounted for 50% of business microcomputers sold through dealers. By the second quarter of this year, its share was down to 44%.

This is a slight rise on the first quarter's figures because, Romtec said, IBM came back with a new range of products.

## ICL delivers for parent

LONDON — Cost-cutting and business sell-offs at the troubled UK computers and communications group STC PLC have glossed over the firm's latest mid-year figures.

Financial results released last week show the company posted pretax profits of $73.1 million in the first six months of its fiscal year, more than twice the earnings that were announced during the same period last year.

STC's computer subsidiary, International Computers Ltd. (ICL), bought by STC in 1984, was once again the saving grace at the company. ICL posted revenue of $839 million, up 11%.

The mainframe company was the only division of STC to boost its revenue.

*Compiled from the Computerworld International News Service.*



# VIEWPOINT

## EDITORIAL

# *Protecting user rights*

Slowly but steadily the consumer protection ethic that has sent shivers along the spines of American manufacturing has wended its way into the computer industry. A recent advance, begun last October but only recently picked up by reporters, involves a pending court case that pits a small Fort Lauderdale, Fla., construction firm, James A. Cummins, Inc., against micro software giant Lotus Development Corp.

Cummins' principal, James A. Cummins himself, alleges that he used Lotus's Symphony product to prepare a contract bid that turned out to be inaccurately computed and further alleges that a Symphony software defect caused said miscalculation. Lotus says it was Cummins who messed up.

The *Cummins* v. *Lotus* case has serious implications for users and vendors alike: A court decision in either direction could set important precedents in the matter of software vendors' liability, or lack thereof, to businesses that feel they suffered because of software inadequacies. Currently, even the most consumer-oriented software firms gainsay any such responsibility, promising only to replace individual software diskettes found to be defective.

(On another front, meanwhile, ADAPSO, the software and service industry's trade association, is urging its members to adopt stronger warranties — guaranteeing that products will perform according to specifications, for example — to stave off court decisions that could impose even *stricter* liability.)

If the courts hold microcomputer software firms responsible for losses caused by software bugs or, worse yet, by end-user misuse, we can expect a rash of lawsuits — many potentially petty — to assault the industry. (In fact, if you must know, we expect that a whole new realm of legal practice would spring up like daffodils in May.)

Smaller software companies with fewer resources would be threatened. Large software firms with large cash reserves, large quality-control staffs and large legal departments would gain an even greater competitive advantage.

It takes no wild speculative leap to see clearly that the spectre of lawsuits and the actual eventual loss of small, aggressive software firms would combine to stifle innovative research and development and ultimately do great disservice to computer users everywhere.

The software industry should be smart enough to move quickly and forcefully to fend off this vision before it becomes reality. Stronger software warranties are a must. Software buyers, like any other consumers, have a right to expect that a product will perform as promised. Steadily improving service and support is another need, since user dissatisfaction often seems greater than ever on this score.

As to *Cummins* v. *Lotus*, the issue may be one of human as opposed to software error; if so, using the case to plunge the software industry into the nightmare world of damage suits goes far beyond what is equitable or necessary to protect user rights. What is needed is wisdom, consideration and action from the software industry, not creation of another legal profession windfall by capricious courts.




## LETTERS TO THE EDITOR

### Mapper turns PCs to coprocessors

The Softalk column, "4GLs Drawing Bead on PCs" [CW, May 19], addressed how products such as Information Builders, Inc. Focus and others suffered from performance problems when running on personal computers.

Sperry Corp.'s Mapper software is used by more than 500,000 people around the world, making it the most widely used fourth-generation language. It is available on all sizes of computers, ranging from PCs to mainframes. To avoid a performance problem when installed on a PC, it comes with a fully sized expansion board that contains a Motorola, Inc. 68010 CPU and 512K bytes of random-access memory (RAM).

This is used, aloog with a proprietary operating system, to run the Mapper software while the PC's existing CPU is employed as the I/O processor. This makes the PC a coprocessor. When the PC is not running the Mapper software, the 512K of RAM is available to DOS.

It might be unfair to refer to the Mapper software as a fourth-generation language, because it is really a complete end-user computing environment, but it has features and capabilities to gladden the heart of the most sophisticated DP professional. Those who have seen it run on a PC cannot believe it, finding almost no limit in functionality when compared with the mainframe version.

Due to its mainframe heritage, Mapper software even supports two added PCs as slave terminals, running terminal emulation software that is included in the package. This ability gives us support for three concurrent users.

It changes our perspective of the system, too, so that we now think of the PC that contains the Mapper software and board as a host for the added "terminal" PCs and the one who uses the tube and keyboard of the "host" PC as just another terminal user.

We use PC Mapper (called Personal Mapper system) to develop and test applications and upload them to our mainframe Mapper system for all to share.

I understand that there is a Unix version of the Mapper system written in the C language that will be marketed soon. This would make Mapper software available on an even wider range of computers, which would address another problem mentioned in the article: portability.

**Freddie G. Bielweiss**
President, Texas Integrated Technologies, Inc.

### Bugs in models hamper reliability

Responding to my contribution to the Reader's Platform, "SDI demands trillions of instructions, 99.9999999% reliability" [CW, June 2], letters to the editor by Edward Fuchs, "AT&T reports no such error rates" [CW, July 14], and Capers Jones, "Software quality data distorted" [CW, July 28], have ignored the major point I wished to make. Both writers object to my use of data from an article, "Cost, cancellations impair software quality" [CW, Nov. 26, 1984], in which Jones is reported as saying, "In very large programs, defects in coding, documentation and incorrect bug fixes result in an average of 300 serious errors per 1,000 lines of code." My attribution of Jones' study to AT&T was incorrect as properly noted by Fuchs.

It is also true as stated in Fuchs' letter that "a software system can deliver reliable performance though it may contain some errors." And Jones writes that from "90% to 97% of the defects" are usually found before delivery of a program to users. These statements are directly related to the point of my contribution. Reliable means that the same results (from a program or experiment) can be counted on each time a process is repeated, which means we can count on the small proportion of errors Jones and Fuchs indicate are likely to remain after testing, debugging and delivery.

James Baginski, quoting General Accounting Office reports in *Aviation Week & Space Technology* [July 14, 1986], states that "only 2% of software products could be used when and as delivered." The main issue my article was addressing is not how may errors remain in a complex software program, but that the models underlying the program may have bugs that the codes (no matter how reliable) are most unlikely to be able to correct.

**David Bendel Hertz**
Distinguished Professor, University of Miami
Intelligent Computer Systems Research Institute

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# VIEWPOINT

## Beyond promises of support: Cost-effective software service

The purchase price of high-quality personal computer software is not really very high. Consider that micro packages costing a few hundred dollars do as much as the multimillion-dollar mainframe packages of years gone by.

But software vendors and customers alike are discovering the cold, hard truth on the bottom line: Support is very expensive. In fact, most vendors run their support services, such as 800-number hotlines, so as to discourage "trivial" questions. Several told us that they wanted the user to have to call two to three times before he got an answer. One major vendor said that if a package purchaser asked for help a second time, the vendor had lost money on the sale.

In reaction, many software vendors are starting to charge for help. They do not mind providing it, they say, provided they can at least break even (or perhaps make money) on the support function. Users say they would not mind paying for help if the help were worth the fee. Too often, those manning the phones are inexperienced employees, able to do little more than read the manual.

#### In-house support alternative

However, there are alternatives: The first is to create an in-house support program. Nearly everyone eventually does some of this, but it is really difficult to provide enough. Enough means that all questions on all the different software packages supported can be answered on a timely basis.

Let us look at the economics: A support professional (possibly an exend user who has decided to play computer junkie — more likely a systems analyst) would be paid about $35,000 per year. The loaded cost of such a professional in corporate America would be at least $50,000 (and more likely close to $70,000) per year. Remember, this person will need a fully configured PC plus a copy of each software package be supports.

Let us assume that he does nothing but answer micro software questions all day long, and let us also assume he actually works a normal 225 days per year (taking into account time off for weekends, vacation, sick leave and training). We would guess he might be able to handle 20 queries per day, if they are not all tough ones and if he works really hard. That is 4,500 questions per year, for a per-question cost of $11.11 to $15.15.



By AMY D. WOHL

Assume that each user uses three different software packages and asks one question about each package per month (a very conservative model). That is 36 questions per year, or $400 to $560 per user per year. And it means you would need a support person for every 125 users, just to provide software support. You would still need other support people for training, bringing up whole new applications, writing custom software, ordering hardware and software, installing, troubleshooting and so on.

#### Buying software support

An alternative to in-house support has recently become available: You could buy software support. So far, two possibilities are active.

Some vendors are offering separate, for fee, software support. This is different than the 800-number and the by-the-hour, what-is-your-Visa-card-number support that has been offered so far. Generally, it is a contract by user or by organization, geared at offering a specific amount of total time or a specific number of phone conversations. Access to senior support staff is often offered, and the vendor generally promises a "no-busy-signal" level of service.

Since such support should be profitable to the vendor and, at the same time, helpful to the customer, expect announcements of such programs to be a common occurrence in future months. Some very large software firms are moving to this type of service, and their policies tend to set the standards others follow. Since this is a relatively new idea, fee schedules are not yet well understood, but software vendors seem to plan to charge more than the next alternative but less than the cost of in-house support.

Also, a new kind of software service organization is starting. Personified by Debby Fain's Micro Support Resource Corp. (MSR) of Atlanta, such firms provide a contractual service to end-user organizations, offering a fixed number of calls for a set fee. Fees are quoted per software package, but MSR will offer to support multiple packages at a discount.

And look at the economics: MSR contracts to service 20 calls on a particular package for $100. That is $5 per call, for a hefty savings over in-house costs. Also, MSR maintains an on-line data base of troubleshooting information by customer and by package, making some questions much quicker and easier. A known bug, for instance, could be quickly diagnosed and a fix identified.

Also, third-party service providers can have special relationships with software firms, with better access to technical information than all but the largest end-user organizations.

Further, organizations like MSR are likely to be the technical backup for smaller firms, unable to provide staff for in-depth support, providing service to end users through fees paid by both the software vendor and, in some cases, the customer.

#### Good news for customers

All this is good news for software buyers, who badly need a way of providing their users with good support without drowning in the costs. Also, the better leveraging of a service-only organization, with its ability to provide cross-user information and its access to special vendor support, may, in fact, be a better mousetrap

In any case, none of the above will change the basic, underiying needs: better software that is more intuitive and easier to use for all classes of users and the careful choice of software packages that each organization will support.

No one, including the new third-party providers, is offering to provide cost-effective support to users who insist on no restrictions to the selection process at all. Selecting small numbers of carefully chosen, broadly attractive packages will continue to offer disciplined organizations the best chance to leverage their PC investments and provide users the best available support.

*Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.*

## Only a changing Cobol can answer the challenge of the future

READER'S PLATFORM

By JEROME GARFUNKEL

For many, the Cobol language is falling behind other application generators, in the measure of productivity. People should not and do not use Cobol for sentimental reasons. Those who use Cobol do so because it is a viable and safe application generator. We must, however, take note of all the fourth-generation languages and other high-level tools that abound today and not dismiss them as a passing fad of our industry. They were created and succeed in the marketplace because there is a demand in our DP industry for high-productivity application generators. Cobol is our most important application generator.

While many applauded the long-awaited update to the Cobol language, Cobol 85, there were others more vocal and more organized who could not justify any changes in Cobol. More important, they could not manage those changes, regardless of how beneficial they may prove to be.

The National Bureau of Standards published a 75-page cost/benefit study of Cobol 85 that concluded that the benefits to cost ratio is 5 to 1. Some, including myself, believe that this will prove to be a conservative estimate over the next 10 years. In spite of this study, it was the argument over potential incompatibilities that captured the public's attention and caused a four-year delay in the introduction of Cobol 85.

To accommodate both sides of the debate, the addenda process of enhancing Cobol was proposed and adopted as a means of keeping Cobol up to date while introducing minimum incompatibilities. Every two or three years, some new compatible features would be added to the official Cobol language, leaving manufacturers free to include or exclude these new features in their Cobol 85 compilers.

It is expected that normal market forces will cause these advanced features to be included in many compilers. Then in 10 to 15 years, the Cobol 95 language would be fully revised, with syntax and semantic corrections and perhaps some new features. At that time, the optional addenda that had been developed during the interim period can be considered for permanence in the new Cobol standard.

The net effect will be to introduce new features to the Cobol community years sooner than they otherwise would have occurred. For many who have not given op on Cobol as their main application generator, this is essential.

Some of those who argue that the addendum process for updating Cobol is too confusing and complex are the very ones who have contributed to making it confusing and complex.

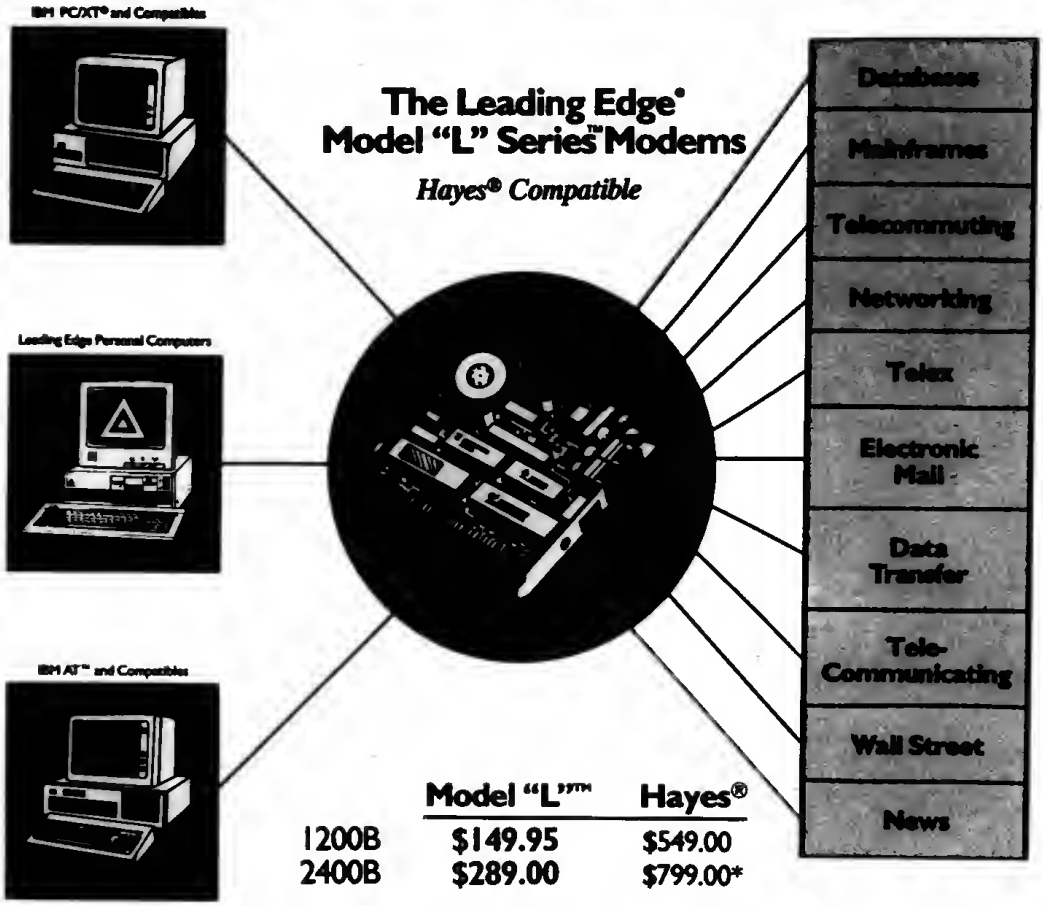
Others who argue for an early full revision of Cobol are naive to think that the recent uproar over potential incompatibilities in Cobol 85 would not be repeated if the language were to be revised in the five-year cycle as previously called for

There are some who are opposed to updating Cobol at all. They believe Cobol is good enough as it is and does not need to be kept up to date with current programming methodologies. Perhaps their real fear is being overwhelmed by the task of managing the changes — lacking either the expertise or the budget. To this group I offer some recent advice from Grace Hopper:

"Continually look abead to absorb the new concepts and implement the new things. Don't ever say, 'Well, we have always done it that way.' That is the deadly thing that kills systems and managers. Just as in the automobile industry or aircraft industry, it's a changing industry You can't sit back. Imagine what happened to the people when the Model T Ford came out — some people said, 'Get a horse.'... There were always people who wouldn't change their minds and move forward with the new things."

*Garfunkel is a Cobol 85 consultant who, as a member of the ANSI X3J4 Cobol committee, was a central figure in the birth of the language.*

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# MICROCOMPUTERS



**MICRO BITS**
William Zachmann

## Practicality key to integration

If you believe the pompous pronouncements of the more ponderous industry pundits, the integration of office systems is something like the quest for the Holy Grail — an infinitely desirable goal nearly impossible to attain. Yet an astonishingly large number of consultants, seminar givers and article writers have made a business out of encouraging users to seek panaceas that promise office integration.

"You can't," as the Rolling Stones' Mick Jagger puts it, "always get what you want,/But if you try sometimes, you just might find,/You get what you need." It is hard to find a better way to characterize the state of office systems integration.

While the "everything solution" remains nowhere in sight, some practical solutions to specific integration problems are available. Though these products do not provide an elegant, simple and total solution, they offer more than enough to make the practical integration of office systems readily available to those users who really want it.

An excellent example of this is the Keyword 7000 Document Translation System from Keyword Office Technologies, Inc. of Calgary, Alberta.

Including both hardware and software, the Keyword 7000 could be described as a specialized expansion chassis for the IBM Personal Computer, Personal Computer XT, AT and compatibles with supporting software that makes it very easy to translate

See **PRACTICALITY** page 23

*Zachmann is vice-president of research at International Data Corp.*

# Datablocks builds process control one piece at a time

**By Douglas Barney**

ALAMO, Ga. — A new concept in microcomputer-based process control was recently announced by Datablocks, Inc. Dr. Ed Roberts, creator of the Altair 8800A (introduced in 1975 and considered one of the first personal computers), developed the product and formed the firm last year to get it to market.

Dubbed Datablocks A-II, the system allows users to build process control systems by adding only the modules needed. More than 30 different stackable hardware building blocks are available including the central processor and memory unit, a random-access memory (RAM) disk, floppy disk and hard disk controllers and drive, power supply, programmable read-only memory (PROM) disk and PROM programmer and voice recognition and synthesis.

The product also includes its operating system, Artdos, specifically designed by Datablocks for process control.

Datablocks A-II handles a wide variety of process control applications, ranging from controlling robots, turning furnaces on and off, making sure tropical fish do not get too hot or cold and maintaining solutions in film processing, explained Jim Bybee, executive vice-president of engineering for Datablocks.

Other applications might include the control of security systems, production line automation, remote data entry stations and data logging systems.

The implementation of process control devices is simple in concept, according to Bybee. "You hook up a processor to monitor different sensors and then take appropriate action based on what is read in those sensors."

The problem, however, is that current products have been difficult to program and have not been flexible. "There is very little available that allows users to put together a development system using the tools that you will be using for doing the actual control," Bybee said.

"Normally," he added, "with your sin-

See **DATABLOCKS** page 20

# Gold Hill to broaden LISP line

**By David Bright and Eddy Goldberg**

CAMBRIDGE, Mass. — At the American Association for Artificial Intellegence Conference this week in Philadelphia, Gold Hill Computers, Inc. is expected to broaden its LISP-related offerings by announcing an Intel Corp. 80386-based add-on development system for the IBM Personal Computer XT and AT, an expert system building environment for the PC AT and a Transmission Control Protocol/Internet Protocol (TCP/IP) network linking LISP machines to engineering workstations, minicomputers and mainframes.

Gold Hill will announce Acorn, a three-tiered software tool for building expert systems on PC ATs and compatibles. Acorn, based on Gold Hill's Golden Common LISP 286 Developer, is intended to allow novices, developers and high-level AI programmers to develop and deliver expert systems on conventional processors. Applications using up to 16M bytes of memory can be built with Acorn, which the vendor claims is the largest expert system building tool available for personal computers.

The top layer is an expert system shell that provides a user interface for easily describing objects and expressing rules and relationships.

The middle level is a tool kit, in which the knowledge representation language is available to the developer. This level requires more programming ability but allows more flexibility.

The lower level is Common LISP and is intended for AI programmers able to use the full power and flexibility of the language.

See **GOLD** page 22

## INSIDE

Leading Edge Hardware Products adds memory to its Model D Personal Computer/**20**

Crosspoint Systems product line allows PCs to share peripherals/**20**

## NEW THIS WEEK

- AST Research offers Turbolaser printer for PCs

For more on this and other new products, see pp. 77-90.

## INSTANT ANALYSIS

*"By year end, Ashton-Tate will have lost 30% to 50% of its development market to compilers like Nantucket's Clipper. They are protecting their revenue base by losing their customer base."*

**— Marty Rinehart, chairman, Wallsoft Systems, Inc., referring to Ashton-Tate's lack of a Dbase compiler**


# Oracle's SQL★Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL★Calc® is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.

**Spreadsheet**



SQL★Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL★Calc allows you to put SQL database commands into spreadsheet cells... just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL★Calc runs identically on mainframes, minicomputers and PCs.

SQL★Calc's foundation is the ORACLE relational DBMS, which provides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.

**Relational DBMS**



Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL★Calc also permits users to modify the database - and even create new database tables - directly from the spreadsheet.



**$995**

SQL★Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL★Calc's ORACLE DBMS requires no supplement: It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

SQL★Calc is available immediately for IBM PC/XTs and ATs for $995.* SQL★Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL★Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

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# Datablocks builds a piece at a time

From page 19

gle-board computer, you buy a development system that might run on an IBM Personal Computer or a Digital Equipment Corp. VAX. We have the whole development process take place right within the Datablocks itself, and then they can be used for the control application. Plus you can replicate a subset of those blocks that you have in the development system, and control several houses, boilers, or oil wells or whatever."

Datablocks A-II can control up to 65,000 different devices, the firm said. Because the system is based entirely on CMOS components, it can be battery operated or include battery backup.

Software developers can write programs in XYBasic, C, Assembler, or the process control language using a keyboard, a CRT and the Datablocks A-II CPU. Those programs can be stored on a floppy or hard disk or burned into PROM, the firm claimed. In addition, the system can reportedly run CP/M software.

Users are pleased with Datablocks A-II so far. Lifeboat Associates, Inc., a software developer based in Tarrytown, N.Y., is using Datablocks A-II to monitor the accuracy of data transferred over radio waves. "We needed the ability to pick up the transmitted signals, check them and determine whether they should be retransmitted before they are put in the PC," said Eddie Currie, chairman of Lifeboat.

With conventional personal computer technology, checking these data transmissions for accuracy was impossible, according to Currie. "There is no bridge to go from the PC into the real world. Datablocks, however, is a system that interfaces between an IBM PC and the real world," Currie said. "They have such a complete set of building blocks that you really don't need anything else."

Hallmark Electronics Corp., a computer products distributer in Dallas, will be selling Datablocks for specific applications. "We have developed a dedicated computer application where the firmware provides the customer with a screen on which they fill in the blanks via menus," said R. B. Fietz, systems manager for Hallmark.

Fietz used an insurance agent as an example. "When a person wants to order an insurance policy, the insurance firm may send a message to a wire service to make sure the policy is ordered. They fill in the blanks of a questionnaire on a screen that goes to the wire service. Datablocks A-II would provide the protocols for signing on and signing off the wire service system and keep track of those transactions for the insurance provider," he said. Fietz declined to disclose what applications Hallmark is developing.

Simplicity of operation is one of the key attributes of Datablocks A-II, according to Fietz. "The user doesn't have to load any software or boot op a program to activate a modem, or something like that. It can be an automatic, all-firmware-generated sequence of events for users that are not sophisticated," he said.

"PCs are just not as adaptable," Fietz continued. "You have to prototype the application, get someone to burn it into an erasable programmable read-only memory (EPROM) and buy an EPROM board." Datablocks A-II allows users to burn their own applications into PROM.

With Datablocks' voice recognition module, users can verbally command the system to monitor certain devices or take appropriate action. The $566 voice recognition block has a vocabulary of 512 words.

The Basic Development System, consisting of a central processor block, PROM/RAM combination disk block, PROM programmer, XYBasic interpreter, Artdos and heavy-duty power supply, sells for $1,600. There is an introductory discount that enables early buyers to get that configuration for $981.

# Leading Edge ups PC RAM

## Expandable to 768K bytes on motherboard

BOSTON — Leading Edge Hardware Products, Inc. last week enhanced its Model D Personal Computer.

The machine, which still sells for $1,495, now comes with 512K bytes of random-access memory (RAM), up from 256K bytes.

In addition, the machine is expandable to 768K bytes of memory on the motherboard, according to Leading Edge.

The Model D Personal Computer includes the Leading Edge Model L 1,200 bit/sec. internal modem, a spreadsheet and Leading Edge word processing software.

According to the vendor, the original Model D with 256K bytes of RAM and two floppy disk drives will now sell for $1,295 and will include Leading Edge word processing software.

Both systems come with a 15-month warranty and include a monochrome monitor.

# Micros share peripherals via switch

EUGENE, Ore. — Crosspoint Systems today announced a line of products that allow personal computers to share peripherals.

The Crosspoint 8 is a $795 software-controlled data switch for personal computers that allows up to eight PCs or peripherals to be connected and to share or add peripheral devices. The $495 Crosspoint AB+ allows up to seven peripherals to be added to a single PC.

The products can be configured through pop-up menus, and each PC can handle up to 16 applications.

In addition, the user can define settings to make particular applications work with specific host computers, plotters or modems. For example, a user could configure the system to automatically send spreadsheet output to a dot matrix printer, graphics output to a plotter, data base output to a mainframe and communications output to a modem.

Both products work with IBM and compatible personal computers. Crosspoint 8 will be available next month. Crosspoint AB+ will be available in October.

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**BIMSWAP** — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
**BIMCMPRS** — CICS 3270 data compression system. Reduces response time for remote terminals significantly. DOS and OS.
**BIM-FMAP** — CICS BMS on-line map generation and maintenance. DOS and OS.
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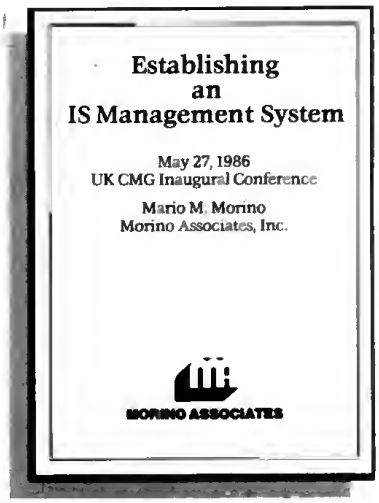
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# Gold Hill to broaden line

From page 19

Gold Hill will market Acorn as a microcomputer-based alternative to developing expert systems on more expensive, dedicated symbolic processing machines. One target market will include domain experts such as engineers, doctors and financial analysts interested in developing an expert system based on their own knowledge.

A step-by-step, on-line tutorial is provided for beginners to introduce them to expert system development.

Acorn components include a complete LISP environment with interpreter, compiler, an inference engine, knowledge representation language, graphics module, interface building facilities and browser.

Technical features include forward and backward chaining, frame-based knowledge representation, power screen generation, mouse support, books to PC tools, certainty factors and an explanation facility.

**Open architecture**

Acorn's open architecture allows users to directly access data from products such as Ashton-Tate's Dbase II and Dbase III and Lotus Development Corp.'s 1-2-3. Acorn is scheduled for first-quarter 1987 availability and will be priced at $5,000.

In addition, Gold Hill will announce a product developed jointly with AI Architects, Inc. of Cambridge, Mass. Dubbed the 386 Hummingboard, the product is intended to help software developers, corporations, value-added resellers and OEMs develop and deliver large AI applications. The board comes bundled with Gold Hill's GCLisp 386 Developer and as much as 24M bytes of on-board memory.

According to officials at the two companies, the 386 Hummingboard cost-effectively converts a personal computer into a high-end LISP machine. Built around a 16-MHz Intel 80386, the board enables a PC XT or AT to run GCLisp approximately five times faster and greatly speeds the critical edit-compile-debug loop.

"The 386 Hummingboard offers an unprecedented level of LISP machine price/performance," claimed Richard Mark Soley, president of AI Architects. "Running GCLisp, the 386 Hummingboard is the first affordable LISP delivery engine powerful enough to run the most demanding applications. The 386 Hummingboard is also an excellent productivity tool for program development."

LISP applications require large memory spaces for development, said Eugene Wang, Gold Hill marketing vice-president. Therefore, the Hummingboard uses either 256K-bit or 1M-bit dynamic random-access memory chips (RAM) to bring memory up to 6M bytes or 24M bytes, respectively.

The board's 32-bit memory data paths and 2K-byte high-speed cache memory yield a processor/memory cycle time typically seen in superminicomputers, according to Wang.

When the board is used, the host PC's processor becomes an I/O processor. Included in the package is an interface for sharing memory with the host processor according to the Lotus/Intel/Microsoft Expanded Memory Specification.

Using the GCLisp Network TCP/IP that is set to be announced this week, developers can integrate their existing applications with other systems and develop distributed AI applications.

Machines expected to be included in such networks include those in Symbolics, Inc.'s 3600 family, Texas Instruments, Inc.'s Explorer line, Digital Equipment Corp.'s VAX systems and Sun Microsystems, Inc. workstations.

GCLisp Network TCP/IP will be available in the fourth quarter for $495 per node.

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IBM ASCII terminals:

# The case in black and white.

**Introducing a somewhat more colorful member of the family.**

Meet the IBM 3164 ASCII Color Display Station.

It gives you eight foreground and eight background colors. On a 14" screen.

And because of its 8 x 16 character matrix, the 3164 gives you clear, crisp characters in color.

But is color any reason to buy IBM's 3164? It is, according to studies that indicate the use of color increases productivity, decreases errors and promotes user satisfaction.

Color, of course, is far from the sole reason for choosing the 3164. To appreciate the others, you should get to know the rest of our ASCII family.

**Emulation. Another side of the family.**

Our ASCII terminals are designed to fit into existing systems. Even if the systems aren't ours.

| Emulation Capability | |
|---|---|
| 3161 | IBM 3101 Model 881<br>ADDS Viewpoint*<br>Hazeltine 1500*<br>Lear Siegler ADM-3A*<br>Lear Siegler ADM-5*<br>TeleVideo 910* |
| 3163 | IBM 3101 Model 881<br>DEC VT 52*<br>DEC VT 100*<br>TeleVideo 950* |
| 3164 | IBM 3101 Model 881 |

For example, our basic ASCII Display Station, the IBM 3161, emulates up to six terminals. And the advanced-function 3163 emulates a number of higher level ASCII data streams.

What's more, every one of our ASCII terminals can operate in its own function-rich native mode.

| Features | 3161 | 3163 | 3164 |
|---|---|---|---|
| Screen size | 12" | 12" | 14" |
| Lines x characters | 25x80 | 25x80 | 25x80 |
| Character matrix | 8x16 | 8x16 | 8x16 |
| Double-sized characters | No | Yes | Yes |
| Line drawing characters | 24 | 24 | 24 |
| Vertical scroll | Jump | Jump/ Smooth | Jump/ Smooth |
| Definable function keys | 24 | 24 | 24 |
| Windowing | No | Yes | Yes |
| Partitioning | Horiz. | Vert./ Horiz. | Vert./ Horiz. |
| Characters in buffer | 1920 | 7680 | 7680 |

**Our family is flexible.**

Our unique plug-in cartridges allow for considerable flexibility in your operation. For example, simply by switching cartridges you can shift a terminal from one data stream to another.

And, in many countries cartridges are also available that go beyond emulation to let you operate your ASCII terminals in several foreign languages. Appropriate foreign language keyboards are also offered.

**Enhanced ergonomics. Another family trait.**

All our ASCII terminal keyboards have 102 keys. But that's not all they have in common. Every keyboard also has a low profile, gentle contour and typewriter touch.

And our keyboards have programmable function and editing keys so they can be custom-tailored to fit your application needs. The 3163 and 3164 models also have redefinable and recappable keys.

Superior ergonomic design isn't confined to the keyboard, however. All three displays tilt and swivel for maximum user satisfaction. And, of course, by making the display easy to read, we made it easier on the eyes. In addition to the 8 x 16 character matrix, we gave it an advanced non-glare etched screen, cursors, and character and field attributes like blink, reverse video, underscoring and dual intensity.

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# Practicality in integration

From page 19

documents from one format to another.

The Keyword 7000 hardware includes a controller card and expansion chassis with its own power supply that can be configured to hold up to two 5¼-in. floppy disk drives along with two 8-in. floppy drives.

The software is a collection of translation routines that run on the PC and compatibles and take advantage of the hardware to offer document conversion among different formats on different media.

Keyword has succeeded in providing a practical way for user organizations employing a variety of word processing systems and software to exchange documents. The product supports a multitude of formats, including AES/Lanier; DEC Decmate; IBM Displaywrite, Displaywriter, OS/6, DCA and 5520; NBI 5¼-in. and 8-in. formats; and Wang PC MS-DOS and CP/M formats.

### Conversions

Of course, conversion between different IBM and compatible PCs' 5¼-in. Microsoft Corp. MS-DOS floppy disk formats is available.

In addition to conversion routines built into many personal computer word processing systems, there are conversion tools available from third parties. Keyword itself offers Softpak, a $449 software-only alternative.

What these alternatives don't do, and what Keyword does very well, is provide conversions between physically different media.

For example, I do much of my writing on PCs, either in my office or at home. The main tool at International Data Corp., however, is an older word processing system that uses 8-in. disks.

The Keyword 7000 provides a very convenient way to move documents back and forth between the various personal computers I use and the office system.

The Keyword 7000 isn't exactly sold at giveaway prices. The product starts at around $4,000 and can run to some $10,000 for a four-drive system with all the bells and whistles.

Still, if getting back and forth between different logical and physical disk formats is a requirement for your operation, the Keyword 7000 is worth considering.

In the real world, there is seldom a need for everything to talk to everything else. On the contrary, the real need is generally for a relatively limited number of specific document conversion paths, along with the ability to easily add others as required.

This reality was recognized in the configuration and pricing of the Keyword system.

You do not have to buy the everything solution at the everything price. Variable configurations make it possible to get just as much as you really need to solve the problems you really have. Additional capabilities can be added later if necessary.




# HP rolls out voice manager for the office

PALO ALTO, Calif. — Hewlett-Packard Co. recently announced Office Talk, a $995 voice communications manager for the HP Vectra, IBM Personal Computer AT and compatibles.

Office Talk is based upon a software application and an I/O card and provides voice messaging, telephone management, a memo pad and an appointment diary. The system can answer the telephone, greet callers, take and forward messages and make calls.

The Office Talk software was developed by HP, and the hardware was developed by Natural Microsystems Corp. of Natick, Mass.

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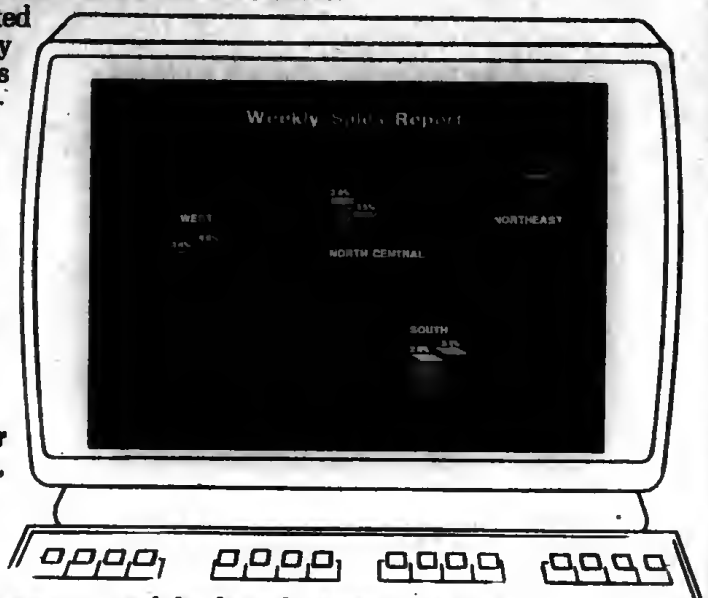
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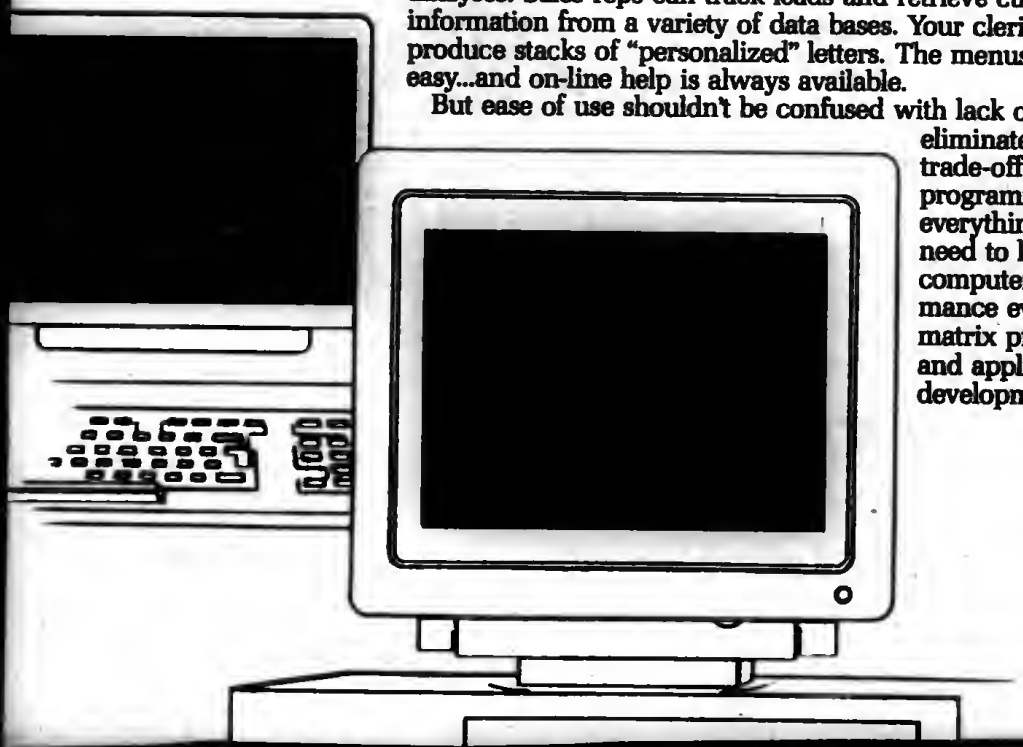
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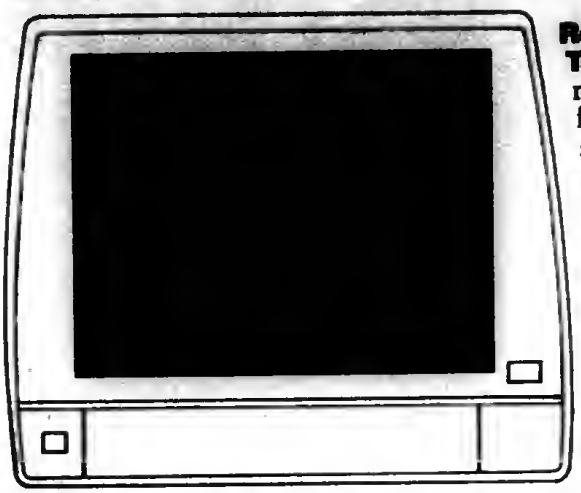



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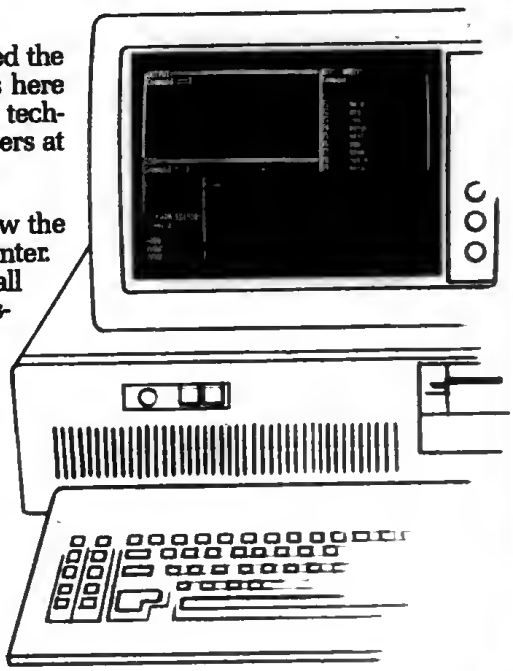


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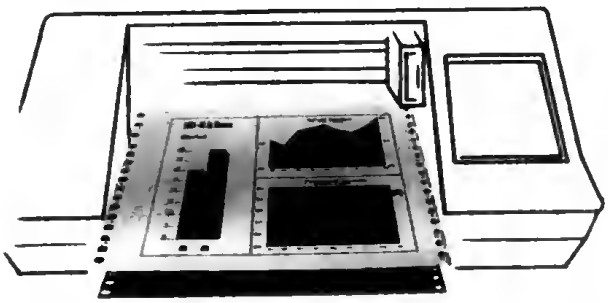
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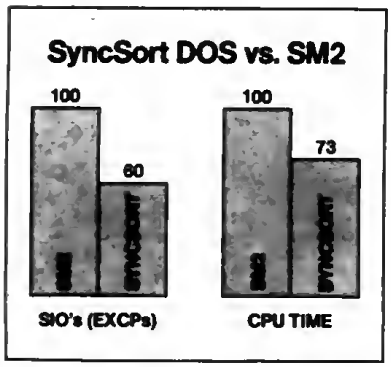
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And sometimes, even, a smart cookie has to be a mighty tough cookie. That means being on the job constantly. Keeping things running and humming. Without draining vital resources.

All of which brings us to our smart cookie: SyncSort DOS. A cut above the rest if you ever saw one. Check these delicious advantages.

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Pop one into your system and you'll see a mouthwatering difference. Immediately. SyncSort DOS will give you performance improvements like those shown in the chart on the left.

And performance features such as:

- **Automatic Secondary Allocation** — With this feature your sorts will never run out of disk space, i.e., no "sort capacity exceeded" messages.

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As you begin to digest SyncSort DOS, you'll find it more and more to your liking. With ingredients that cut down to size the amount of programming time going into applications.

- **SortWriter** — A powerful tool that can produce extensive reports as a by-product of your normal sorting — without user exits and the associated programmer investment. Headers, trailers, total and sub-total capabilities provide flexible formatting.
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## Three-schema path to future

Much is being said and written about three-schema architecture. What is architecture in this context, and how does it contribute to data base management system (DBMS) design?

In the software context, architecture is a statement of general approach, principle and design philosophy. Architecture is also the layered structures and framework of software. This framework is defined in terms of standards, basic rules and functions, formats, protocols and software interfaces.

Software architecture is a relatively constant point of reference that guides software developers and insulates applications and users from the negative impact of change. The prime example of an architecture and its impact on third-party developers is IBM's Systems Network Architecture, which was announced in 1974.

In this context, then, schema means data view. Three schema suggests three views of data in a given DBMS architecture. The three-schema architecture was defined in 1977 by the American National Standards Institute/Standards and Requirements Committee Study Group on Data Base Management Systems.

In 1975, the study group was formed to investigate data base management systems to determine what DBMS aspects were candidates for the development of an industry standard. The

See **THREE** page 29

*Winter is the manager of standards and quality assurance of the Computer Services Division, City of Toronto.*

# DEC hopes VAX CAE tools open mainframe site doors

**By Charles Babcock**

MARLBOROUGH, Mass. — Digital Equipment Corp. has teamed up with independent software suppliers to offer computer-aided software engineering tools on its VAX workstation series.

The move is intended to extend DEC's software development offerings beyond its own tools, particularly in the systems analysis and design phases.

By strengthening its product line, DEC plans to sell more VAX-based development systems to not only its own customer base but also to IBM mainframe sites.

A workstation-based development environment offers the sites the chance to move development off their mainframes, according to Michael P. Kendall, director of computer-aided software engineering marketing.

The tools being offered come from cooperative marketing agreements with Nastec Corp. of Southfield, Mich.; Tektronix, Inc. of Beaverton, Ore.; and Boston Systems Office, Inc. of Waltham, Mass.

Nastec has ported its Designaid package, a structured analysis, structured design and data modeling tool, to the DEC workstation line.

The package was previously available on a Convergent Technologies, Inc. workstation and the IBM Personal Computer AT, according to Kendall.

Programmers using Designaid may create a graphical analysis of a new system and graphically lay out its design and interconnection before coding.

It also includes a design dictionary said to ensure consistency of elements throughout the design process, Nastec officials said.

Designaid will be available in October at a price of $9,900, according to Kendall.

Tektronix has ported its Structured Analysis (SA) tools, Structured Design (SD) and Language Development Systems to the workstation line and VAX family of minicomputers.

SA includes a set of defect-prevention tools that are said to pinpoint errors before design work begins. The tools also

See **DEC** page 32

**DATA VIEW**

### Leading software firms' stock outpaced industry average

*Overall, software and services companies moved up an average 5.2% in April over March closing prices.*

| Firm | Increase |
|---|---|
| VM Software, Inc. (VMSI) | 33% |
| Hogan Systems, Inc. (HOGN) | 32% |
| National Data Corp., Inc. (NDTA) | 21% |
| Cullinet Software, Inc. (CUL) | 19% |
| Computer Associates International, Inc. (CASI) | 17% |

Information provided by: E. F. Hutton & Co. Equity Research

# Report generator develops code for D & B Nomad2

**By Peggy Watt**

WILTON, Conn. — D & B Computing Services, Inc. recently announced the Nomad Assistant, a report generator and front end for its Nomad2 fourth-generation language.

The Nomad Assistant provides a menu-driven system to let the user develop Nomad2 code and produce data base management system reports. The reports may be generated from the mainframe data base management systems with which Nomad2 interfaces, including IBM's IMS, SQL/DS, and DB2; Cullinet Software, Inc.'s IDMS;

See **REPORT** page 34

## INSIDE

Henco Software announces a revision of Info DBMS to interface with Data General's CEO/**32**

VM Software performance monitor with expert system capability debuts/**32**

## NEW THIS WEEK

- Expertware offers software development aid

For more on this and other new products, see pp. 77-90.

## INSTANT ANALYSIS

*"In case anyone had any remaining doubts, relational DBMS are taking over the data processing world. Every major DBMS vendor has announced SQL support, with the latest being Cullinet."*

**— Paine Webber, Inc.'s July 30 edition of "Software Industry Notes"**

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# Three-schema path to future

From page 27

membership of the study group included representatives of Eastman Kodak Co., Boeing Computer Services Co., Exxon Corp., General Electric Co., Honeywell, Inc., IBM and Cincom Systems, Inc. Significantly, the study group rejected all DBMS candidates for standardization. Instead, it published an architecture on which future DBMS development would be based. This three-schema architecture provided for full data item and data structure independence from the use of the data.

Two major areas were not addressed by the group, these being navigation and normalization. Fortunately, E. F. Codd's relational model defined a set theory-based method for navigation, and authors James Martin, C. Gane, T. Sarson and others have published works that provide useful methodologies in the domain of normalization.

Thus, these three major concepts — the three-schema architecture, the relational model and normalization — become the foundation on which DBMS designers should build if the resulting product is expected to have a significant impact on the market and users of the 1980s and early 1990s.

> ***The three-schema architecture, the relational model and normalization become the foundation on which DBMS designers should build.***

There are one-schema DBMS, for example IMS from IBM, Total from Cincom and IDMS from Cullinet Software, Inc. These are all first-generation DBMS. Essentially, the one-schema architecture consists of a stored definition of the data items and structures with a suitable data manipulation language (DML).

In this environment, the programmers became data base specialists because of the overwhelming concern with navigation and serious integrity issues. Clearly, applications received less attention than was necessary. The extensive data base navigation logic was sensitive to data structures, and performance-driven data restructuring was common. Consequently, programs and systems became highly complex, with a significantly increased maintenance burden.

The two-scheme architecture is based on a "conceptual schema," or a set of stored definitions of the logical content of the data base, and an "internal schema," which is a set of stored definitions of the physical content of the data base.

DMLs operate on the conceptual schema level. While the two-schema architecture is an improvement, programs are still dependent on the logical location of the data; that is, relational operators (such as Select, Project and Join) are still dependent upon table names. Still wanting in this system are automatic integrity, rule enforcement, data structure independence, full DML functionality and improved ease of use.

It is not surprising that the three-schema architecture comes with three schemas: conceptual, internal and external. The external schema supports derived views without limitations over the conceptual schema. The conceptual schema has the logical definition of base tables, which are independent from the internal schema. The internal schema deals with the physical data structures, including access methods (such as VSAM and BDAM), indexes, hashing, pointer access, and so on.

The significance of the three-schema architecture lies in the following:

- Full support of derived views, or data structure independence.
- Full DML capabilities (Locate/Replace for Get, Insert, Update, Delete).
- Full support of domains. (Data attribute definitions now include item type characteristics.)
- Automatic and guaranteed integrity enforcement regarding data content, structure and reference.
- An on-line directory or active dictionary.

A DBMS based on three-schema architecture has a layered design in which the first layer (first schema) the application views is independent of the second layer, the base tables (second schema). The base tables are independent of the third layer, the physical files and access methods (third schema). In this environment, all systems and programs must access and update data through the view facilities under the control of the on-line directory.

So, this architecture with the relational model offers unparalleled structure independence, data manipulation functions and automatic integrity enforcement (entity, domain and reference). This type of architecture provides the type of insulation that would allow one to implement significant teleprocessing, direct-access storage device, access method and even corporate data model changes without requiring application maintenance.

A good grasp of a software architecture enables one to predict not just the possible but also the probable software developments in the future. A DBMS based on the three-schema architecture places its vendor and users in a strong and enviable position for years to come.



SIS HAS FOUND A NEW HOME AT DUQUESNE SYSTEMS

Duquesne Systems, a long time leader in providing software for managing shared devices for MVS and MVS/XA users, is now home for the Single Image Software product line. SIS products let you effectively manage the sharing of tape drives, DASD, and consoles, while maintaining data integrity.

MSM works to effectively manage the allocation of tape devices across all systems in your multiple CPU complex. MSM allows normal operations with all devices on line to all systems. MSM provides for truly natural and transparent shared device management.

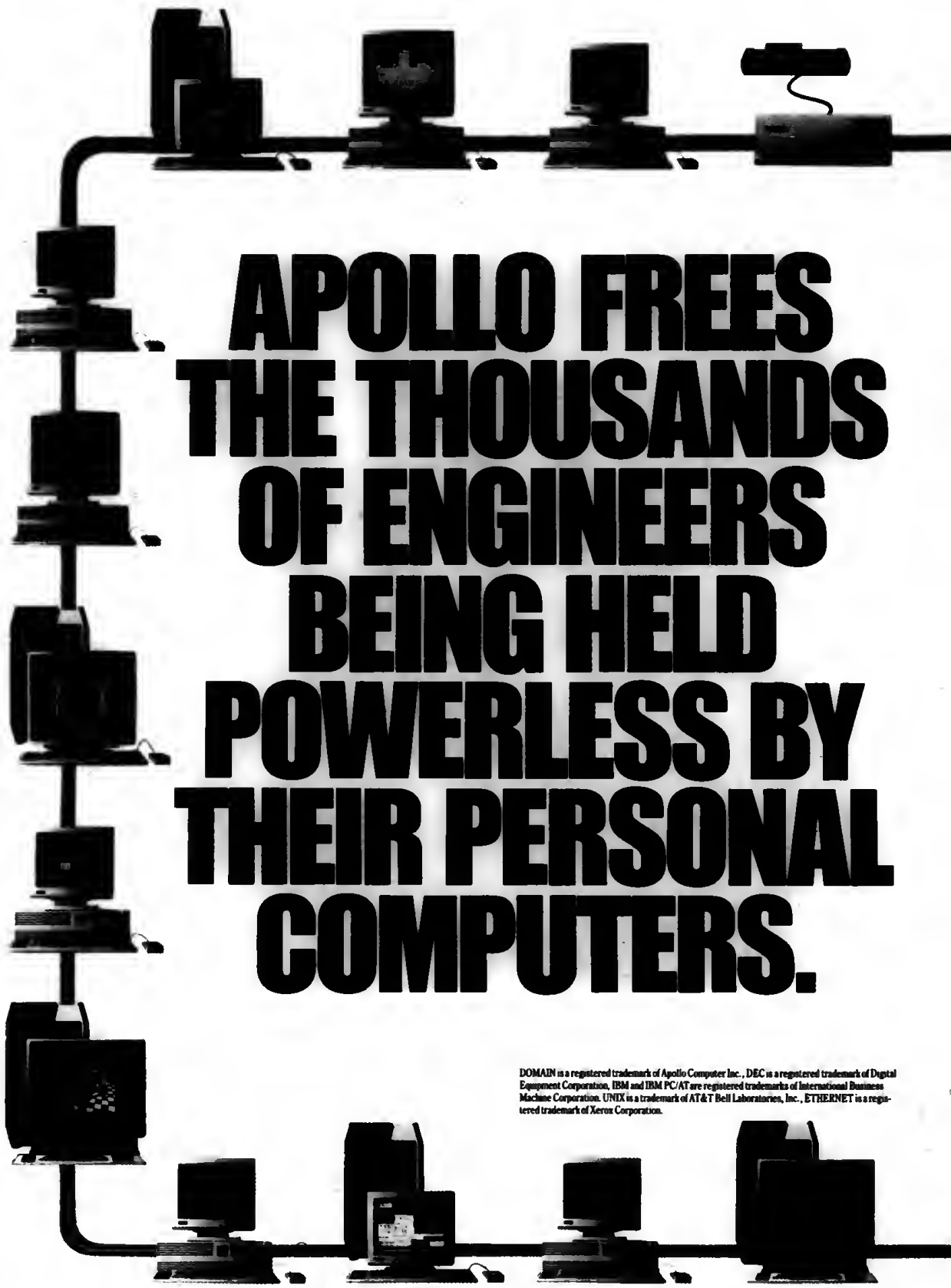
MSI works in a multiple CPU environment to share DASD, maintain dataset integrity, and eliminate reserve lockouts. MSI provides the same thorough dataset protection for jobs executing in multiple CPUs that exists when jobs execute on a single CPU.

GCD consolidates all console messages into one dataset and then provides the ability to selectively transmit them to consoles that are functionally designated. The blended message stream creates a unified system image and provides for a more streamlined operation.

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# Henco ties Info to OA system

## Can interrupt DBMS, interface DG's CEO

WALTHAM, Mass. — Henco Software, Inc. is offering a release of its relational data base management system, Info, with an interface to Data General Corp.'s office automation system, Comprehensive Electronic Office (CEO).

"Users will be able to interrupt work in Info through a single keystroke to send short messages or view their electronic mail in boxes" in CEO, said Robert Steele, vice-president of sales and marketing at Henco.

Revision 9.41 also has an enhanced interface to the DG file structure, Infos II, that allows a user to read a locked record and use system variables in a key path.

With the Info interface, the following functions can be used: invoking the CEO calculator, monitoring the CEO message status from Info, storing an Info spool file in a CEO file cabinet and creating a CEO list document containing Info items for CEO List Processing.

Revision 9.41 runs on the DG Eclipse/MV series with CEO Release 2.2. It is available immediately at prices ranging from $8,600 to $40,000, depending on system size, said Paula Slotkin, Henco spokeswoman.

# Real-time system monitor added to VM Software line

VIENNA, Va. — VM Software, Inc. has added VMMonitor to its product line, an expert system for evaluating VM system performance in real time.

VMMonitor is said to report system variables and analyze how to improve system performance.

The System Automatic Monitor component reportedly can offer prescriptions for performance improvements or invoke system options on its own.

**Warning system**

The monitor can also warn of impending problems before they cause a system outage, according to VM Software spokesman Gary McClain.

The monitor analyzes performance at three levels: system resource utilization, user analysis and device analysis.

At the user-analysis level, the monitor identifies users who may be contributing to performance problems or who are being hampered by them, a company spokesman explained.

VMMonitor is available immediately at a price of $7,000.

The price will increase to $9,000 after Oct. 31, the spokesman said.




# DEC hopes CAE tools open doors

From page 27

perform many of the same automated functions as the Nastec line but do so in a manner typical of the Tektronix approach. DEC wanted both tool sets available for its workstations, Kendall said.

The Language Development Systems package includes tools for developing, debugging and integrating software modules and Pascal and C cross-compilers for high-level language programming with microprocessor-specific functions, Kendall added.

SA costs $6,000 on a DEC Vaxstation, and SD sells for $3,000. Language Development Systems is priced from $8,500 to $10,000.

> ***'The three companies make joint customer calls and share each other's expertise.'***
>
> — Michael P. Kendall
> Digital Equipment Corp.

Boston Systems Office has ported its BSO/Planner, a scheduling and planning support tool, to the workstation line and the VAX series. The BSO/Planner is available at a retail price of $2,000 on a Vaxstation.

The three companies have entered into cooperative marketing agreements with DEC, which means they make "joint customer calls and share each other's expertise," Kendall said.

The tools are offered as a complement to DEC's own software development tool kit, which includes the front-end design tool, the VAX Cobol generator and several programming productivity aids.

The set is available at a price of $4,615.

The workstation line on which the tools run is the Vaxstation series, which ranges from the $15,000 Vaxstation II/RC to the $35,000 Vaxstation II GPX.

The workstations include a high-resolution, 19-in. color monitor with mouse and keyboard and run both DEC VMS and the Ultrix version of Unix.

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# Natural language query tool bows for DBMS front end

By Charles Babcock

WALTHAM, Mass. — Intellect, a natural language query system from the Artificial Intelligence Corp., is available as a front end to Digital Equipment Corp.'s relational data base management system, RDB.

The Intellect version for the VAX is written in DEC's VAX-C and runs under the VAX operating system, VMS. It is priced at $6,500 on the Microvax and $28,500 on the VAX 8800.

Users are able to specify a request for information in English-style statements to Intellect, an expert system, according to the vendor.

Intellect is then able to recognize such requests and translate them into RDB calls to retrieve the requested data and present it in a formatted report, according to Earle Martin, director of marketing at Artificial Intelligence.

Intellect is also marketed as a natural language front end for IBM mainframe query systems by IBM and Cullinet Software, Inc., according to the vendor.

Intellect has an installed base of 500 licenses, Artificial Intelligence representatives said.

# Inference upgrades ART

## Expert system dumps 'garbage collection'

By Charles Babcock

LOS ANGELES — Inference Corp. has announced performance improvements in an upgrade of its Automated Reasoning Tool (ART), a programming tool for developing expert systems.

So-called "garbage collection" in ART Version 3.0 has been all but eliminated, Inference spokesmen said. Garbage collection in a LISP program is that portion of the program devoted to searching for available memory.

A LISP programmer working with ART Version 3.0 allocates and releases memory as he would in using a mainstream third-generation language, leaving the ART program free to process without memory allocation, said Chuck Williams, chief technology officer at Inference.

"Performance increases are achieved through elimination of random pauses associated with batch garbage collection and the reduced virtual memory space . . . associated with incremental garbage collection," spokesmen said.

Through the elimination of memory searches and through other improvements, ART Version 3.0 is up to 30 times faster than its predecessor in certain applications, Williams said.

ART Version 3.0 will be available in the fourth quarter for Symbolics, Inc., LISP Machine, Inc., Texas Instruments, Inc.'s Explorer workstation, Digital Equipment Corp.'s VAX and Sun Microsystems, Inc.'s Sun-3. It will be priced at $65,000.

Chances are you don't currently audit your operating system—even though it's ultimately in control of information used to manage your organization. And for good reason.

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# Report generator for Nomad2 code

From page 27

and others.

Although the user need only make menu choices, the developing program is also displayed in an adjacent window so the user can learn the code in the process, said Robert B. Vonderhaar, senior product manager.

The Nomad Assistant is scheduled to ship Oct. 1 and is intended as an enhancement to D&B's 7-year-old Nomad2, said Frank B. Lee, senior vice-president.

The Nomad Assistant is priced at $7,500 for use with the IBM VM/CMS and MVS operating systems. Nomad2 is priced at $135,000.

The Nomad Assistant is also different from D & B's previous report generator, EZ Nomad, released two years ago, which was also menu driven, Vonderhaar said. EZ Nomad had been free to users of Nomad2 but, with the release of the Nomad Assistant, will be licensed for $7,500.

The Nomad Assistant includes a catalog that serves as an automatic log of activity for all or any part of a session. An indefinite Undo function allows users to retrace their steps. Multiple windows are available, showing different forms of the work being done. Later revisions can be made with the same screens and commands and do not require a separate editor, according to Vonderhaar.

Also, extensive integrity checks help keep the user from writing contradictory commands or other invalid requests, Vonderhaar added. The Nomad Assistant can be customized with specific menu options or with the sequences of commonly used procedures, according to Vonderhaar.

He added that the latest offering in the Nomad line is an attempt to satisfy the spectrum of fourth-generation language users, which D & B considers to range from the experienced programmer to the user who wants a simple method of solving problems or finishing projects.

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| | Tucson | Jul 17 | | Triangle Park | Oct 14 |
| **CA** | Los Angeles | Jul 16 | | Winston-Salem | Sep 23 |
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| | Newton | Dec 4 | | Ottawa | Oct 30 |
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| **MN** | Minneapolis | Oct 23 | | Toronto | Nov 13 |
| **MO** | Kansas City | Sep 18 | | Winnipeg | Oct 14 |

*1986 Computer Intelligence Corp. survey of 7000 VAX sites. Market share: INGRES 44.8%, DEC 29.8%, Oracle 25.8%.

# INGRES. The Distributed SQL Relational DBMS.

# SYSTEMS & PERIPHERALS

**HARD TALK**
James Connolly

## Overtime on cartridge shift

What had been expected to be a long, slow transition may be moving much more quickly than computer industry analysts predicted as MIS departments continue to shift from IBM 3420-type reel-to-reel tapes to IBM 3480-type cartridge tapes.

Some tape conversion numbers coming out of a California consulting firm's research may surprise people. The numbers surprised the consultants.

"We thought people were going to move very slowly and gradually. But we found that once people get the 3480 technology in-house, they move a lot faster than anyone expected," comments David L. Bunzell, director of the Santa Clara Consulting Group of San Jose, Calif. The group is a market research firm that serves the disk and tape media storage industry and maintains a data base of user companies.

Bunzell's company examined how MIS departments throughout the U.S. and Canada are using the 3480, which was announced in early 1984 and delivered later that year. The research shows that in Canada, which Bunzell says was IBM's test market for the 3480, companies that installed the cartridge drives converted an average of 36.11% of their tape libraries by the end of 1985.

"I would say that during the 1986 to '87 time period, you are probably going to hit 50% in the U.S. and Canada and 70% by 1990," Bunzell says, noting that conversion rates in the U.S. are probably higher than in Canada and that Europe lags behind Canada.

It is that conversion pattern that suprised Santa Clara Computing, which also found that the 3480 is selling well overall. "I think a lot of people found the conversion a lot smoother than they expected, and maybe this is why it is

See **OVERTIME** page 44

*Connolly is* Computerworld's *senior editor, systems & peripherals.*

# First user rates AS/XL 60

## Grumman's NAS unit fares well against IBM 3090/200

**By Eddy Goldberg**

MELVILLE, N.Y. — The Grumman Data Systems Division of Grumman Corp. recently installed one of the first-shipped National Advanced Systems Corp. (NAS) AS/XL Model 60 mainframes.

The uniprocessor AS/XL Model 60 was priced at approximately $5 million and was designed to compete with IBM's dyadic 3090 Model 200.

The NAS AS/XL Model 60 that Grumman uses is equipped with 128M bytes of memory and 32 channels. It will run a network of advanced computer-aided design and manufacturing tools under IBM's MVS/XA operating system. It arrived, as scheduled, in the beginning of July and was installed quickly and without difficulty, according to Dan Larkin, Grumman's vice-president of MIS.

Larkin said the AS/XL Model 60 is performing to specification and matches the range announced by NAS. He said that the AS/XL Model 60's performance was better in some areas and worse in others compared with the IBM 3090 Model 200 in two benchmark tests and that the variation ranged about 7% in either direction. He said its price was about 15% less than that of the IBM 3090 Model 200.

When the Model 60 was announced last year [CW, March 18, 1985], NAS claimed its performance would be comparable with IBM's 3090 Model 200, which has been rated at 28 million instructions per second (MIPS). Though an NAS spokesman declined to give performance figures in terms of MIPS, he said the Model 60's

See **USER** page 44

**DATA VIEW**

### Report Card

*Hewlett-Packard Co. and Digital Equipment Corp. rated highest in minicomputer support.*

| Troubleshooting: | Weighted Average | Number Responses |
|---|---|---|
| HP | 3.31 | 291 |
| Prime Computer, Inc. | 3.30 | 76 |
| DEC | 3.26 | 364 |
| IBM | 3.14 | 939 |
| NCR Corp. | 3.14 | 92 |
| Tandem Computers, Inc. | 3.13 | 30 |
| Harris Corp. | 3.13 | 24 |
| **Education:** | | |
| HP | 3.20 | 291 |
| DEC | 3.15 | 364 |
| Tandem | 3.13 | 30 |
| IBM | 3.09 | 939 |
| NCR | 3.04 | 92 |
| Prime | 3.03 | 76 |
| **Documentation:** | | |
| DEC | 3.20 | 364 |
| IBM | 3.12 | 939 |
| Tandem | 3.10 | 30 |

Rankings based on a February 1986 Datapro Research Corp. survey of 2,538 users asked to rate vendors on a 1-4 scale.

# System/36 still not acclaimed as PC integrator

**By David Bright**

Many Fortune 1,000 companies have found IBM's System/36 minicomputer to be severely lacking as an integrator of personal computers.

Although IBM announced the upgrading of its System/36 line and PC Support/36 products in June at the 1986 National Computer Conference, users interviewed recently by *Computerworld* were divided as to the System/36's effectiveness.

Linda Modiste, hardware manager at The Beacon Corp. in Boston, said that the System/36 still has a long way to go. "The System/36 is not a machine built for real heavy communication work with lots of remote connections," she said. Concerning Personal Computer integration, "IBM hasn't really done enough work to keep up with the demand," she said. "Emulation is one thing, but on making a PC an active terminal of the System/36, IBM doesn't seem to be getting there too fast."

One data processing manager content with IBM's improvements is Terry Haise of Litton Precision Gear in Chicago. "With

See **SYSTEM/36** page 42

**INSIDE**

Cimlinc, Inc. announces computer-integrated manufacturing workstation/**42**

General Dynamics to become exclusive reseller of Canaan Computer systems to government/**43**

**NEW THIS WEEK**

- Genicom introduces 1000 series dot matrix printers

For more on this and other new products, see pp. 77-90

**INSTANT ANALYSIS**

*"You never know what is behind something like a price increase. These are tactics that are purely designed by the bottom line."*

**— George Weis, analyst, Gartner Group, Inc., on Data General Corp.'s price hike for certain hardware and software systems**

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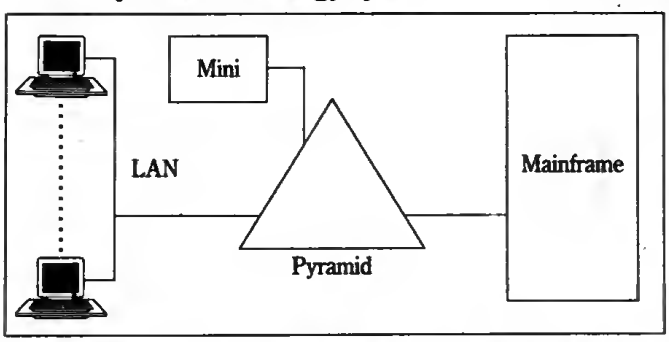
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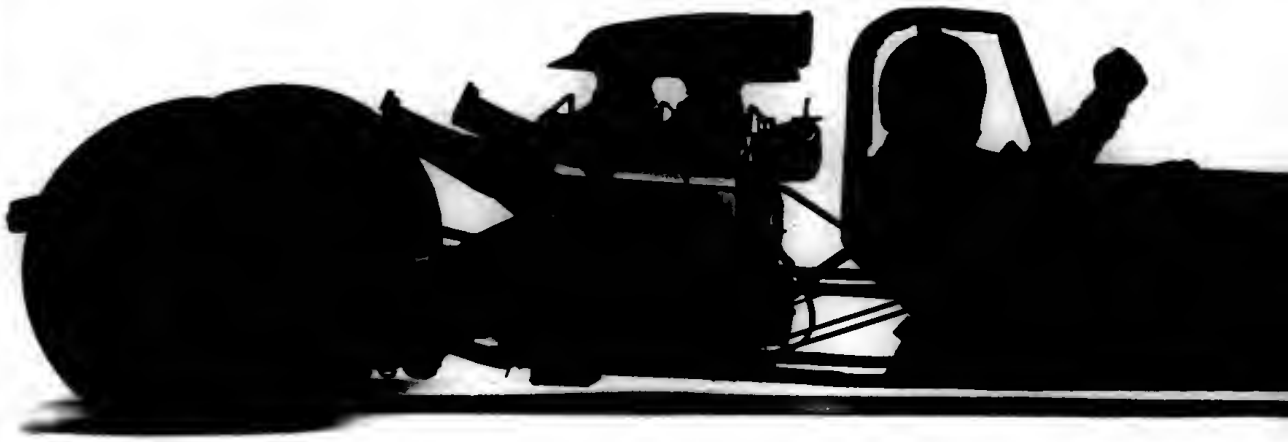
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# GUESS WHO WINS THE DATA BASE RACE?



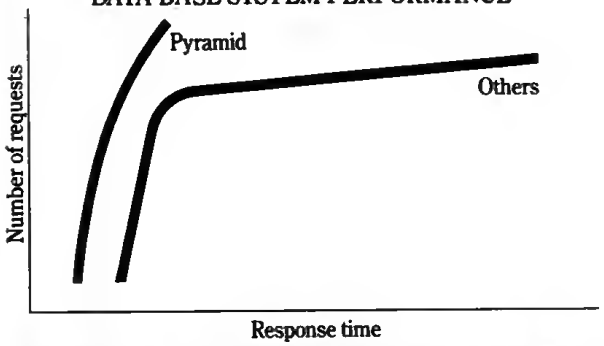
*VAROOOM!*

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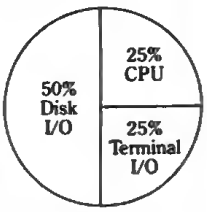
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# Cimlinc bundles workstation, tools for CIM environment

By Rosemary Hamilton

ELK GROVE VILLAGE, Ill. — Cimlinc, Inc. announced last week that it is shipping a 32-bit workstation and application packages that when used together can create a computer-integrated manufacturing (CIM) environment.

Power CIM, based on the Motorola, Inc. 68020 microprocessor, is offered with a monochrome display for a starting price of $11,990 or with a color display for $15,990.

Users can add both memory and storage modules to the basic system, which includes a separate I/O processor that is based on the Motorola 68000, 4M bytes of main memory, an 86M-byte disk drive, an 11-slot Intel Corp. Multibus card cage and a floppy disk drive.

The color system accommodates up to six 4M-byte memory modules, and the monochrome version supports seven 4M-byte modules. The modules are priced at $3,200 each, according to Cimlinc President John West.

Up to seven storage modules can be added to Power CIM. A $3,995 module includes one 86M-byte disk drive and a floppy disk drive, and a $7,995 module includes two 86M-byte disk drives.

According to West, Power CIM is geared toward those users who have wanted a dedicated system but could not justify the high cost. "We cloned the workstation standard when it evolved and can now offer it at a much lower price," he said.

### Applications packages available

Six applications packages — including three new packages and three upgraded ones — and communications software are available for the workstation, which operates under the University of California at Berkeley 4.3 version of Unix.

The new software packages are CIM Solid 1, a three-dimensional solids modeling tool that sells for $2,995; CIM Intelligent Documentation, a $3,995 package designed to produce text and graphics documentation; and Avatar, a tool for parametric design that sells for $2,495.

The communications software, CIM COMM: SNA 3270, sells for $12,495, and a $1,496 license must be purchased for each node. According to West, the software gives Power CIM access to Ethernet networks and an IBM 3270 host. It allows the workstation to emulate either a Digital Equipment Corp. VT100 or VT200 terminal and an IBM 3270 terminal.

Upgrades will be released for CIM CAD, a computer-aided design package that sells for $3,995; CIM CAM, which sells for $6,495 and is designed for computer-aided manufacturing applications; and CIM Surf, which costs $6,495 and is used for 3-D surface modeling.


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# System/36 still not acclaimed

From page 37

the new processors and PC Support/36, [PC integration] should work very well," he said.

Haise's shop has had good luck with its Model B, but it is his understanding that even a current Model C is "more than healthy enough" in most cases. For the most demanding situations, the new processors should do the trick, he said.

The extent of the dissatisfaction was revealed in a report released earlier this year by Forrester Research, Inc., a Cambridge, Mass., market research and consulting firm specializing in departmental computing. According to that report, other minicomputer companies will benefit from the System/36's shortcomings.

Of 300 Fortune 1,000 sites surveyed, 35% of the respondents rated the System/36 "unworkable" as a PC integrator, while a mere 5% said it was a "good solution." Of the remaining respondents, 20% said the System/36 was usable as a PC integrator, although "not perfect," and 40% were not familiar enough with the system to comment.

Seeming to answer some of its critics, IBM at NCC announced increased throughput, memory and storage capacities within its System/36 line in addition to an enhancement of its PC Support/36 functions.

IBM's upgrades may help a little, but the real improvements are expected later this year when IBM introduces its low-end 4300 and a controller, said John McCarthy, research manager at Forrester Research.

Additionally, McCarthy pointed out that the new products generally will not be available until early next year. By that time, the "baby 4300," used with the new controller, could provide a better solution, he said.

While IBM works out its mid-range problems, minicomputers from Digital Equipment Corp., Wang Laboratories, Inc. and Hewlett-Packard Co. may gain popularity as PC integrators, McCarthy noted.

"We have found that the System/36 does not have sufficient power, ease of use or functionality to meet users' needs," McCarthy said. "Users seem to view it as just another incompatible, short-term, mid-range offering from IBM."

# General Dynamics contracts to sell Canaan machines

By Rosemary Hamilton

TRUMBULL, Conn. — Following a joint marketing agreement announced late last year, Canaan Computer Corp. and General Dynamics Corp. last month announced a second agreement in which General Dynamics will be the exclusive reseller of the Tempest version and primary reseller of the commercial version of Canaan's IBM VM/CMS-compatible departmental computers to the federal government.

General Dynamics would not specify the value of the four-year contract, but according to the agreement, the firm is committed to purchasing at least 40 systems from Canaan.

A General Dynamics spokesman would not provide pricing or delivery information.

The defense contractor will resell the Tempest and commercial versions of the Canaan DCS 5400 and the commercial version of the Canaan DCS 5800.

Canaan introduced the DCS 5800, an enhanced version of its DCS 5400, earlier this year. Both are designed as IBM-compatible departmental hosts and reportedly run unmodified IBM VM/CMS applications.

The DCS 5400, introduced in November 1984, is based on a proprietary processor and can accommodate up to eight users. A basic system comes with 2M bytes of main memory, expandable to 8M bytes, and an 85M-byte disk.

> ***The Model 5000 and 5000T will be bundled with a General Dynamics relational data base and office automation package.***

The DCS 5800 has three times the system throughput as the 5400, a Canaan spokesman said. It can accommodate up to 36 users. A basic system includes 2M bytes of main memory, expandable to 12M bytes, and an 85M-byte disk, expandable to 664M bytes of storage.

The Model 5000 and 5000T run the General Dynamics operating system Multos and will be bundled with a General Dynamics relational data base and office automation package.

In September 1985, General Dynamics said it would be selling both the Model 5000 and the Model 5000T, based on the Canaan systems, to the federal government, marking the first time the company offered what it calls departmental mainframes.

## HARDWARE NOTES

# Tandem inks fast food pact

**Tandem Computers, Inc.** has landed contracts with **Kentucky Fried Chicken Corp.** (KFC) and **Safeway Stores, Inc.** The chicken purveyor, headquartered in Louisville, Ky., bought a sales reporting system, a Tandem spokesman said. A Tandem Nonstop EXT will be online by September to collect daily sales figures from KFC's 1,224 co-owned restaurants in the U.S.

The system, using software from LeRoux, Pitts & Associates of Clearwater, Fla., will dial up the restaurants' electronic cash registers overnight to collect sales data. The system is a replacement for another, but neither Tandem nor KFC would say whose system it replaces.

Tandem also sold two systems to Safeway for a pilot implementation for order processing, warehousing and communications applications to be used within Safeway. Neither Tandem nor Safeway would comment further.

■

**Wang Laboratories, Inc.** released figures on sales and rentals of its **Digital Voice Exchange** (DVX) voice mail product for the fiscal year. The company sold 300 voice mail systems and rented 20,000 DVX voice mail boxes through its Wang Information Services Corp., a firm which was set up last summer to market the DVX product that was introduced in 1981.

■

Six engineering schools have received grants from **Control Data Corp.** The vendor's **Engineering Center Network Program**, designed to aid in cooperative research, technology and education projects, now includes the U.S. Air Force Academy, Bradley University, Montana State University, New Mexico State University, New York University, Courant Institute and Texas A & M University.

These schools will join roughly 17 other schools that have received approximately $11 million in the past year toward the purchase of hardware and software products from CDC.

■

**Advanced Micro Devices, Inc.** says that its AM29332, a 32-bit arithmetic logic unit, is now in production. The company claims that the unit speeds throughput with a parallel processing feature, executing in a single cycle instructions that previously required several cycles.

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# Overtime on cartridge shift

From page 37

going faster. There are few glitches," Bunzell says.

However, Bunzell also notes that there have been some companies that have acquired no 3480s, leading to reports that IBM does not believe that 3480 sales are meeting projection and that IBM is looking for ways to stimulate sales.

Some of the reluctance to buy 3480s is on the part of customers who now use reel-to-reel drives supplied by plug-compatible vendors such as Storage Technology Corp., Bunzell says.

He notes that some customers are waiting for Storage Technology and other vendors to announce their versions of the 3480 in hopes that the plug-compatible manufacturer drives will be cheaper and will include more features, particularly a 5,000-cartridge automated tape library that Storage Technology has hinted will be announced this year.

**Financial firms first to commit**

One interesting trend revealed in Santa Clara Consulting's review of the worldwide market for the 3480 is that the banking and financial industries were among the first to commit to the cartridge drives.

But in the year-end study of Canadian conversions, banks using 3480s were slower than education and other market sectors in transferring their libraries from reels to cartridges.

Santa Clara Consulting also pronounced a finding that can be nothing but good news for users.

The researchers noticed that manufacturers new to the data storage market — companies such as video cassette and precision plastics companies — are entering the ¼-in. tape cartridge market.

That threat of competition already has forced companies such as IBM to lower their prices for cartridges, and it will force prices down still more between now and 1990.

The researchers estimated that costs for North American customers could fall 50% by 1990.

This fact bodes well for user companies that are seeking to convert thousands of 10½-in. reels to 5-in. cartridges while trying to find ways to pay for all of those cartridges.

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EXECUCOM

# User rates AS/XL 60

From page 37

performance range is 1.44 to 1.81 times that of the IBM 3081 Model KX, while the IBM 3090 Model 200's range is 1.5 to 1.9 times that of the 3081 Model KX.

In other words, promised performance gains for the NAS AS/XL Model 60 are 4% to 5% less than comparable claims for the 3090 Model 200 when both are compared with the 3081 Model KX.

The AS/XL Model 60 and the more powerful AS/XL Model 80 are intended as a migration path for the NAS AS/9000 processors for large corporate customers that need more computing power. Though it is not field upgradable, it runs the same software, and the changeover is transparent, according to Larkin. The AS/XL Model 60 is replacing an NAS 9060, some of an Amdahl Corp. 5840 and will accommodate planned growth during the next six months.

**Performance, savings cited**

Grumman's reasons for selecting the AS/XL Model 60 included the need for increased performance and additional capacity, plus the savings from only one software license needed with the larger machine.

Also, since the AS/XL Model 60 is air cooled, as opposed to the water-cooled IBM 3090s, no plumbing installation was required.

The AS/XL Model 60 corresponds to the M-680H uniprocessor from Hitachi Ltd., which supplies NAS's hardware. It is part of the AS/XL family, which is formed entirely of very large-scale integration circuitry and reportedly uses 2,000 and 5,000 gate/chip emitter-coupled logic (ECL) devices with switching speeds of 200 and 250 picoseconds. Its ECL chips are reportedly 3.5 times denser than corresponding ECL circuitry in the IBM 3090 series.



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# COMMUNICATIONS

**DATA STREAM**
Elisabeth Horwitt

## Ask 'what if?' prior to change

At a recent users conference, I heard a fascinating talk about network performance management by Thomas W. McDonald, founding partner of Waltham, Mass., network performance consulting company MGT Technology Group, Inc. I'd like to pass on some of his main points, with a few interpretations and emendations of my own.

McDonald outlined a three-part strategy for achieving effective network performance management. First, the manager needs to attain network awareness — to know where his network performance levels are today in order to plan for tomorrow.

The second key element is optimization and tuning: taking existing resources and squeezing the best performance out of them. Third is capacity planning, which ensures good operation in the future, given changes in hardware, applications, user population and, of course, available network technologies.

Various tools can help the network manager move toward his goal. Monitoring systems boost network awareness by tracking network performance in terms of level of component operation, transmission error rates, traffic patterns and the like.

Monitoring operations ensures that hardware and software is up, modems synchronized and lines operational. Component utilization monitoring helps identify potential spikes — sudden dips in response time that occur when com-

See ASK page 46

*Horwitt is* Computerworld's *senior editor, communications.*

# Order from network chaos

## Tool helps Grumman manage software code

**By Elisabeth Horwitt**

CALVERTON, N.Y. — A centralized network resource management product from Digital Equipment Corp. helped Grumman Corp.'s aircraft equipment testing facility "solve a network manager's nightmare," according to systems technology project manager Robert Meihofer.

Over the past two years, Meihofer's group has set up an in-house telemetry system, which performs real-time collection and processing of data generated during tests of aerospace equipment. The distributed system, which became operational approximately six months ago, consists of three linked clusters, with two more to be installed in the near future.

Each cluster is made up of two DEC VAXs and eight Microvax IIs connected on an Ethernet local-area network. The Microvaxes collect the test data and convert it into graphic representations. The VAXs acquire, store and process the data.

The testing facility's systems staff realized it needed a centralized network management system to "enable us to meet a number of challenges, such as system software management and maintenance and preserving data integrity and consistency of software updates at the remote nodes," Meihofer said. Ideally, a network manager at one central location would be able to coordinate and support distributed systems, not only on the local Ethernet but also across a fiber-optic link to another building or across satellite and microwave connections to facilities in other cities and states.

Meihofer's staff had just about decided to develop the management software in-house when they learned DEC was about to release its own product, Remote System Manager (RSM). RSM is composed of two types of software, a server that runs on a

See ORDER page 47

# LAN servers can swap files

**By Elisabeth Horwitt**

PALO ALTO, Calif. — A growing number of IBM Personal Computer local-area network (LAN) vendors are starting to provide a feature that analysts claim is crucial for large electronic mail installations: a store-and-forward capability that enables file servers to exchange documents and electronic mail.

Without store-and-forward functionality, most LAN systems cannot effectively provide electronic mail to large installations of 100 users or more, claimed PCC/Systems Vice-President Phillip Whalen Jr. Many server products limit the number of users that can concurrently log on to the system.

With IBM's PC Network and Ungermann-Bass, Inc.'s Net/One, the limit is 32 concurrent users, according to Whalen.

See LAN page 50

# Stratus connnects its fault-tolerant systems with PCs

**By Stanley Gibson**

MARLBORO, Mass. — PC/Connect software, recently unveiled by Stratus Computer, Inc., allows users of IBM Personal Computers and compatibles to access and exchange information with a Stratus Continuous Processing system over a dial-up or dedicated link.

"IBM connectivity has always been part of our product strategy," said Stratus spokeswoman Anne Phaneuf. Many Stratus installations also have "a lot of PC users that need to access the fault-tolerant computers' data and resources," she added. The product works with all Stratus computers, including the System/88 computer, which is made by Stratus and resold by IBM. However, PC/Connect is not being

See STRATUS page 50

### INSIDE

PCLink turns VAXs into Macintosh file servers/47

### NEW THIS WEEK

- Western Union offers Memory Mail on Easylink service
- Raycom announces 5110 series fiber-optic multiplexer

For more on these and other new products, see pp. 77-90

### INSTANT ANALYSIS

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# Ask 'what if?' prior to change

From page 45

ponent use exceeds a certain level. Spikes often occur before a component is being used to full capacity, McDonald says. Careful tracking of utilization levels helps the manager plan for component upgrades.

Once the manager has an accurate picture of the network, including possible bottlenecks, response-time spikes and traffic patterns, he can begin tuning the network to optimize resource usage and do capacity planning.

Here the manager might make use of network modeling tools that simulate network performance under different scenarios of components and work loads. More managers are constructing a model of the network and performing "what-if" analyses: If I change this or add that, what will that do to overall response time?

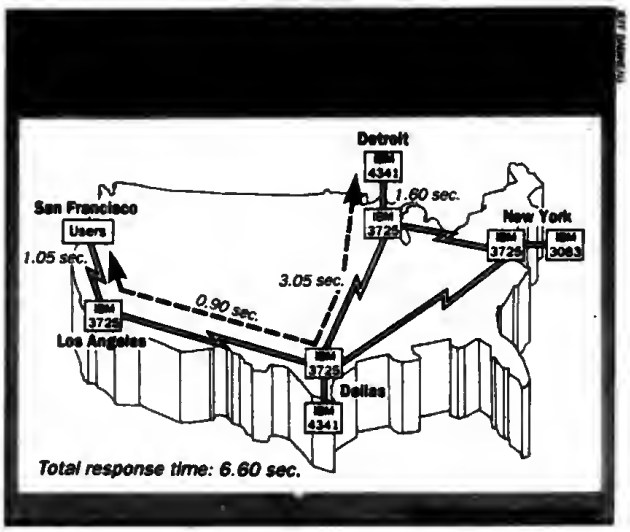
The program simulates a given network configuration, including message arrival rate, message size, terminals and control units, data rates, protocols, distances, modem delays and data flow control parameters. It may also have to include network parameters such as routing, prioritization and so on.

Once the model is in place, the manager enters a proposed change. For example, what if I add or delete resources (controllers, terminals, PCs, multiplexers, protocol converters, remote front-end processors)? What if I redesign the application software? What if I change routing patterns or priorities?

Using a model to simulate a new network configuration enables the manager to determine whether the change will make response time better or worse — and more important, to assign costs to proposed changes.

During his talk, McDonald presented a composite scenario embodying several cases he worked on as a consultant.

A company has an IBM 4341 in Detroit, another 4341 in Dallas and an IBM 3083 in New York. A group of users in Los Angeles access the Detroit mainframe through a link to Dallas (see diagram this page).




Response-time problems develop when a new group of users in San Francisco begin accessing the Detroit mainframe via the Los Angeles-Dallas connection. Monitoring shows that average response time for the San Francisco node is 6.6 seconds. Maximum acceptable response time, according to corporate MIS policy, is 6 seconds.

According to McDonald, it is not the network manager's job to figure out how to reduce San Francisco users' response time to acceptable levels. Rather, he should analyze different solutions in terms of response-time levels vs. cost and leave the final decision up to the managers responsible for balancing budget constraints against user service-level priorities.

Using modeling software, the network manager can compare different possible solutions with the problem — without going to the trouble and expense of actual implementation. He might, for example, query the system: What if we increased the number of 9.6K bit/sec. leased lines between Dallas and Detroit from two to three? The system might give the following results: San Francisco node average response time: 5.45 seconds. Increase in cost: $1,500/month.

Another possible scenario the manager might try: What if we reconfigure the system so that San Francisco users access the Detroit mainframe by way of the Dallas-New York-Detroit links instead of through the (currently overburdened) Dallas-Detroit link? System's response: San Francisco node average response time: 6.15 seconds.

See ASK page 47

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# Order from network chaos

From page 45

VAX or Microvax host and a client that runs on Microvax or Vaxstation II workstations.

Once installed on the test facility's Ethernet-based clusters, RSM helped the technical support staff cope with "the tremendous logistical and management problem" of maintaining operating system and application code configurations, Meihofer said.

Traditionally, the staff would perform periodic software updates at each user station, using a local hardware device. This involved time-consuming direct file-to-file transfer using Decnet communications software. "We have 40 Microvax IIs; providing backup archiving hardware with a 50M- to 100M-byte capacity for each station would cost us $120,000 or more," Meihofer said.

The staff also found it difficult to maintain consistency of software updates over a distributed system. "We wanted to ensure that when an engineering decision decreed a change in the software, it would be implemented at all user sites," Meihofer noted.

With each user maintaining software on local disk, there was no way to ensure that applications software updates made by users were implemented throughout the installation.

"Users are so wrapped up in their work, and mass storage devices so reliable, that they don't always do backups," Meihofer said. "Then when a hardware failure does occur, they lose useful updates."

With the implementation of RSM, network managers can maintain one consistent version of the operating system and application code at a central storage facility. Software can be downloaded to remote stations "with a few type-ins," according to Meihofer. The need for individual backup storage devices is eliminated, along with the danger of losing new updates through user carelessness.

The facility's systems staff began testing RSM approximately two months ago and is now satisfied that it works, Meihofer reported. "It has saved us from developing the functional equivalent ourselves."

# Ask 'what if?' prior to change

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Increase in costs: zero.

The manager can then present these trade-offs to his superiors, leaving them to decide whether the company can live with a 6.15-sec. response time or whether it is worth paying $1,500/month more to get response time down to 5.45 seconds.

The tools and procedures outlined above make the network manager's job easier in two ways, according to McDonald. First of all, he avoids crises by doing proactive rather than reactive network management. Second, he is forearmed with more complete knowledge of the network, which enables him to make more effective decisions and to "take a firm stance, no matter what his company hits him with."

# Software lets Mac users store files on VAX

## Pacer PCLink update offers direct, remote transfer capabilities

**By Rosemary Hamilton**

LA JOLLA, Calif. — Apple Computer, Inc. Macintosh users can store and access files on a VAX minicomputer from Digital Equipment Corp., using PCLink Version 3.0 from Pacer Software, Inc.

The recently introduced version of Macintosh-to-VAX communications software enables users to create virtual disks on a VAX or Microvax II, then access the data as though it resided on a local disk, according to Pacer. A user can activate a virtual disk capability and create up to four 1.6M-byte virtual disk files on the VAX. The Macintosh considers the disk files to be separate storage devices.

PCLink Version 3.0 includes Version 2.0's DEC VT100 and VT200 and Televideo, Inc. 950 terminal-emulation capabilities. Files can be transferred between the Macintosh and VAX systems via a direct RS-232 terminal connection; remotely via a Hayes Microcomputer Products, Inc.-compatible modem; or over Omninet, a local-area network from Corvus Systems, Inc.

The software has a command file function, giving the user the option of customizing communications applications, the vendor said. With the command file, a user can establish a predetermined time in which the Macintosh will automatically dial up a host, log on and then upload files to a designated directory.

Version 3.0, which is currently available, is licensed at a starting price of $2,000 per VAX. Only the VAX portion of the software is licensed, allowing unlimited distribution of the micro software portion.

The vendor also markets an IBM Personal Computer version of its PCLink. It has a similar virtual disk feature, allowing IBM PC users to create virtual disk files on the VAX.


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# LAN servers can swap files

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This can result in access bottlenecks and delays when the system is overburdened by too many users seeking to send or access electronic mail, he noted.

For Ungermann-Bass, the 32-user limit is a function of the number of networking software features supported on a server's network card, according to product manager Mark Hawkins. The company plans to expand the number of concurrent users supported, he added. Novell, Inc. is said to have raised its limit from 32 to 100 users per Netware server.

A common way around the limitation is to "create separate post offices on different servers," Whalen noted. But if mail cannot be forwarded from one server to another, users wishing to send electronic mail must first log on to the server on which the recipient's mailbox resides. "Say you want to send the same set of five documents to managers whose mailboxes are located on three different servers," Whalen said. "You have to set up the transmission and log on to a different server three times."

**Store-and-forward capabilities**

PCC/Systems' latest version of CC:Mail Dialout, announced in late July, provides store-and-forward capabilities for any network system that supports the IBM PC-DOS 3.1 operating system. The product works in conjunction with the vendor's electronic mail package, CC:Mail. A dedicated PC running Dialout acts as postmaster for a group of servers, periodically scanning their mailboxes and transferring remotely addressed mail to the right server.

The older version of CC:Mail Dialout featured document exchange between servers on different LANs connected by a dial-up remote link. The newer version, priced at $995, provides that capability plus document exchange among multiple servers on the same LAN.

Store and forward is a "very important feature that is still missing from Novell's Netware and IBM's PC Network electronic mail systems," said David Terrie, president of Boston-based Newport Consulting.

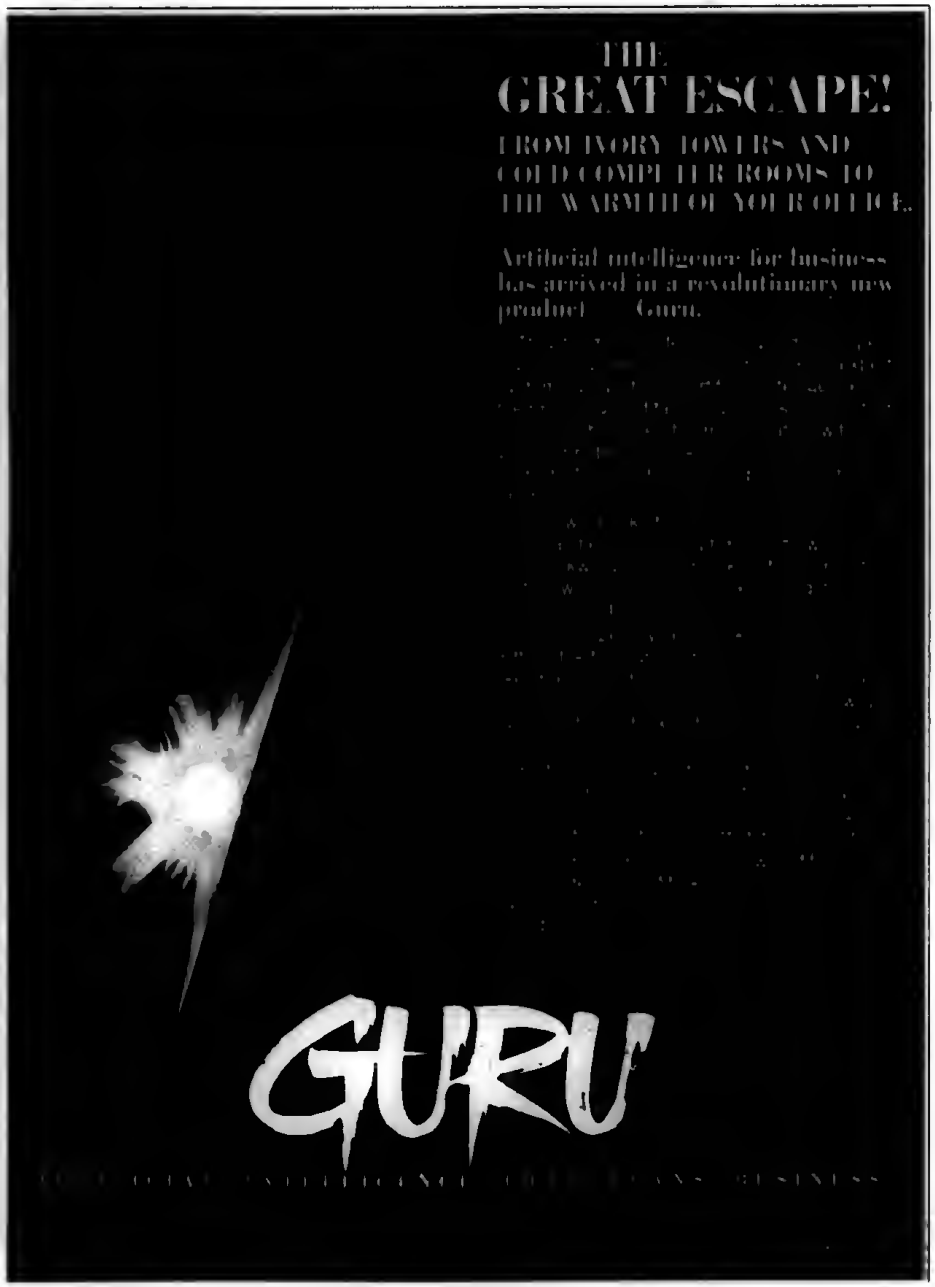
"With Novell, a user still has to log on to his server in order to pick up mail, even if he happens to be on the opposite side of the country," Terrie said. With store and forward, a user traveling to another company site would find his mail waiting for him when he arrived. Banyan Systems, Inc.'s Virtual Networking Software (Vines) and 3Com Corp.'s 3+ both offer store-and-forward capabilities for their file-server software.

**Directory management**

Both Vines and 3+ offer directory management capabilities that CC:Mail lacks, however. "Internetworking can generate some nasty problems when it is not coupled with the ability to keep track of address changes without continually having to do global network directory updates," Terrie said. This is especially important for extensive installations that consist of multiple LANs linked over distance, he added.

While 3Com's 3+ also requires periodic global network updates to keep track of user relocations, it provides a way for mail to be automatically forwarded from a user's old location to the new one.

Under the Vines distributed naming scheme from Banyan, users do not log on to a particular server. Rather, they log on to the network and call up network services without having to specify which server it resides on. Servers exchange information about relocations of network resources, so access requests can be routed over remote links to the LAN where the correct server resides.




# Stratus connects systems with PCs

From page 45

sold through IBM, Phaneuf said.

"It allows users to access Stratus files and send PC files to Stratus and store them under fault tolerance," Phaneuf said. Some users may want to store files in a fault-tolerant computer because they would be more secure and available there than in a PC, she added.

PC/Connect consists of PC-resident software, called Stratus PC/Connect Term, and host-resident software, called Stratus PC/Connect Host. PC/Connect Term allows PC users to log in to Stratus' VOS operating system and operate as a Stratus terminal with access to a complete range of applications. A set of 10 PC/Connect Term diskettes costs $1,000.

PC/Connect Host enables IBM PCs to perform file transfer and other PC functions while still connected to the Stratus host in terminal mode. Under PC/Connect Host a PC can list the contents of a PC directory, store and retrieve PC files to VOS and display disk volume label and current directory for any disk drive while still in a VOS terminal mode.

Users can also temporarily suspend an operation taking place under the Stratus VOS operating system and run a PC application. PC/Host is priced at $2,000 per system.

PC/Connect is available under a site licensing agreement that allows unlimited copying of the diskettes for use on a single site, according to Larry Sherman, Stratus manager of product support programs.

The product may be used with any Stratus system running VOS Release 5.0 or above and any PC running IBM PC-DOS Versions 2.0 through 3.1

# Executive Report

*Edited by Janet Fiderio and Becky Batcha*




ILLUSTRATION BY ROB SAUNDERS

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# Information centers

## *Their choice: Justify existence or go out of business*

By JOANNE KELLEHER

Most information centers started out with the goals of creating some order amid the chaos of unsupervised microcomputer acquisitions and educating unskilled users in elementary applications. Now that many of them have fulfilled their original calling, however, information centers are arriving at a juncture, a point that either signifies the beginning of their true vocation or the end of their organizational usefulness.

Starting up an information center is not all that difficult, says Katie Kuryla, project manager of the information center at Ryder Truck Rental, Inc. in Miami. "At least a lot of people have done it before, and you can follow their lead to some extent." The real problems crop up later, she says, when MIS is no longer selling the concept of end-user computing to management but needs to demonstrate the solid benefits time and time again.

Kuryla and her peers in information centers everywhere are meeting the challenge through a variety of means, and their efforts serve as examples for others. No guidelines exist on how to successfully manage a maturing information center, because the first generation is only now beginning to come of age. As it does, the forerunners frequently find themselves challenged operationally, economically and politically.

Operationally, mature information centers confront issues such as how to serve an increasingly divided user base and how to avoid being left in the shallows of micro installation and training while the corporation moves ahead toward the deeper waters of strategic information management.

"There are a good number of information centers today that are either being dissolved or are dissolving themselves," says Randy Casto, head of the Casto Group, Inc., a consulting firm in Lenexa, Kan., that specializes in information centers and office automation. Casto says these information centers "get caught up in a vicious cycle of installing PCs and delivering basic training and overlook the need to identify strategic corporate requirements."

Economically, information centers that pass beyond the honeymoon phase often find themselves caught between escalating user demands for resources and dwindling management enthusiasm for funding on faith.

***Waning MIS support for funding on faith forces information centers to prove their economic and strategic worth within the corporate structure.***

*Kelleher is a Boston-based free-lance writer who specializes in high technology.*

# Justify existence or go out of business

Continued from previous page

"The problem," says Don Faistl, manager of information resource planning at International Flavors and Fragrances (IFF) in Hazlet, N.J., "is that, as you reach the point where you almost become a utility for users, you can't quantify the benefits of what you are doing." Unlike traditional data processing shops, he says, information centers create no tangible resources. "So there's no real basis for saying that you are saving X amount per year."

Politically, the managers of some information centers find that, after two or three years, their original platform will no longer support them.

One particularly shaky plank is the concept of using information centers to reduce the data processing backlog. "Most information centers rated that as a very high priority when they were set up," says Eric Rolfe Greenberg, project director for the American Management Association's (AMA) "1986 AMA Report on information Centers," produced in cooperation with *Information Center* magazine.

When information centers rated their success in meeting objectives, Greenberg notes, "That one wound up just about at the bottom of the list," well behind achievements in training employees to use software, improving relations between DP and end users and standardizing microcomputer hardware.

Gary Livingston, of Livingston & Associates, a Lakewood, Ohio, consulting firm specializing in the development and management of information centers, says he sees a backlash — similar to the one that rubbed out quality circles in many manufacturing firms — developing against information centers. "The very name has become anathema to some companies that set them op too quickly and just because everyone else was doing it," he says.

Livingston has already been cautioned at one client company not to talk about the department he works with as an information center, because upper management wants nothing to do with one of those. "They told me, 'We're doing all the same things you're talking about, but please don't say information center,' " he recalls.

Despite all the obstacles, many mature information centers have managed to survive and thrive — usually without having to change their names. There is no master blueprint for how to succeed, not only because the elapsed time and numbers are not sufficient for retrospective evaluation but also because successful centers do not so much grow according to a pattern as evolve to fit the unique requirements of their organiations. But managers whose information centers are approaching maturity can look to the examples set by others in the same position.

The 3½-year-old information center at Cordis Corp., a Miami-based manufacturer of pacemakers, provides a good example. "I'd say there's been a 200-degree shift in our role over the last year and a half," says Dale Delaney, associate manager of the information center. "Functions like training and support for basic spreadsheet and word processing applications are now a minimal part of our work."

Those functions constituted a large part of the center's work during the early days, she says. But she and the information center staff now concentrate more on technical projects su ·h as manufacturing support and communications rese .rch, "Because those are the things that are most important in terms of corporate goals."

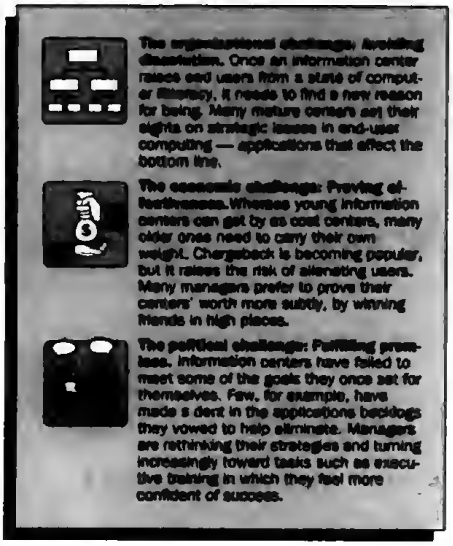
Delaney has not abandoned novice end users. She has, however, managed to branch into new areas while reducing the number of information center personnel by two.

Her methods, in this case, included a heavier than usual reliance on manuals, a shift to group training for basic skills and a strong emphasis on information sharing among staff members and end users. In the future, she says, the job of supporting beginners should get even easier. "There are so many self-training aids and tutorials coming out now that, before long, basic users will be pretty much self-supporting."

Delaney does not stand alone in her great expectations for self-training tools. The AMA's recent information center report noted an increased reliance on computer-based training (CBT), either for self-instruction or as a component in a training program. The report predicted a 16.4% increase in the number of information centers making some use of CBT and a jump of 60.6% in the number of trainees using tutorial disks during 1986.

**MATURING GRACEFULLY: OLDER INFORMATION CENTERS FACE THREE CHALLENGES**

MICHAEL J. HAY



**The organizational challenge: Avoiding dissolution.** Once an information center raises end users from a state of computer illiteracy, it needs to find a new reason for being. Many mature centers set their sights on strategic issues in end-user computing — applications that affect the bottom line.

**The economic challenge: Proving effectiveness.** Whereas young information centers can get by as cost centers, many older ones need to carry their own weight. Chargeback is becoming popular, but it raises the risk of alienating users. Many managers prefer to prove their centers' worth more subtly, by winning friends in high places.

**The political challenge: Fulfilling promises.** Information centers have failed to meet some of the goals they once set for themselves. Few, for example, have made a dent in the applications backlogs they vowed to help eliminate. Managers are rethinking their strategies and turning increasingly toward tasks such as executive training in which they feel more confident of success.

If CBT can help to free information centers from some of their training responsibilities, its usefulness will bear great significance. By all accounts, one of the keys to continued vitality of an information center is a shift from production line training to support and orchestration of more sophisticated applications.

"At first you can open the doors and take all comers," says Ed Katterson, vice-president and manager of the 3-year-old information center at Manufacturers National Bank of Detroit. "Later on you have to be more selective because, after all, there's only so much that you can do at the lower levels to improve productivity. The payback really comes in the managerial and professional computing levels."

Besides reaping paybacks in productivity, information centers that put their resources behind strategic business applications also consolidate some political power. At Goodyear Aerospace Corp. in Litchfield, Ariz., for example, the information center gained four new staff members and a lot of exposure when it took on responsibility for administering a pilot project in the use of IBM's Professional Office System.

"It was a management decision to try this on a pliot basis, and when the project feli into the lap of the MIS manager, he decided to push it over to our group," explains Bob Uecker, senior information center specialist.

Until this project came up, Uecker says, the information center — which consisted of him and one other person — had spent most of its time training finance personnel to use a mainframe editor and application programs that ran in batch mode on an IBM 4341 and introducing a few users to the operation of six microcomputers.

The new assignment, however, involved surveying work areas to select pilot participants, making presentations to top managers and training executive managers, all of whom participated in the experiment. "All of this meant that the information center was moved into a very high-visibility role," Uecker says.

Achieving high visibility is nothing less than a survival skill for information centers, according to Faistl at IFF. "You don't want to spend all your resources supporting soemone who isn't a rising star or a department that doesn't have high visibility," he says. Faistl set up the company's information center in 1983 and

Continued on page 54

**Expert's Opinion**

## So who needs info centers?

By NAOMI KARTEN

Now that training users to insert diskettes label-side up is no longer the name of the game in most companies, some MIS managers are beginning to question whether the information center is an organization with a finite — and rather short — life cycle.



Karten

Once users outgrow introductory courses and a pat on the back for hitting the right combination of keystrokes, these managers wonder, does the need for an information center continue?

Absolutely. As users' skills and expectations increase, the information center's role actually needs to expand. Now that business people have overcome the fear that their keyboards will self-destruct, information centers will retain their vitality by leading the way toward the application of end-user technology to business problems.

Peter Potthoff, assistant vice-president and information center director at Liberty Mutual Insurance Co. in Boston, feels that the task of guiding end users to strategic computing will fall to the information center for two reasons. "Traditional MIS doesn't necessarily have this vision," Potthoff says, "and information centers are the ones involved in the introduction of new technologies."

In order to carry out their mandate, information center staffs will offer training in three critical areas:

- **Problem analysis.** The presence of a personal computer on an end user's desk means nothing on its own. Most users know very little about how best to use their machines. They tend to reach for the nearest familiar product, regardless of how well it suits the problem at hand. Helping employees match their computer skills to business problems contributes to more effective PC operation.
- **Data usage.** As users access and manipulate increasing amounts of corporate data, they need to learn more about data concepts and appropriate data usage. One of the information center's prime roles in the future will be to help users understand the differences among raw data, aggregate data and summary data and choose the information that best suits their needs.
- **Validation.** Program testing comes as second nature to programmers but not to casual end users,

See KARTEN page 54

*Karten is president of Karten Associates, a consulting firm in Randolph, Mass., that specializes in end-user computing.*



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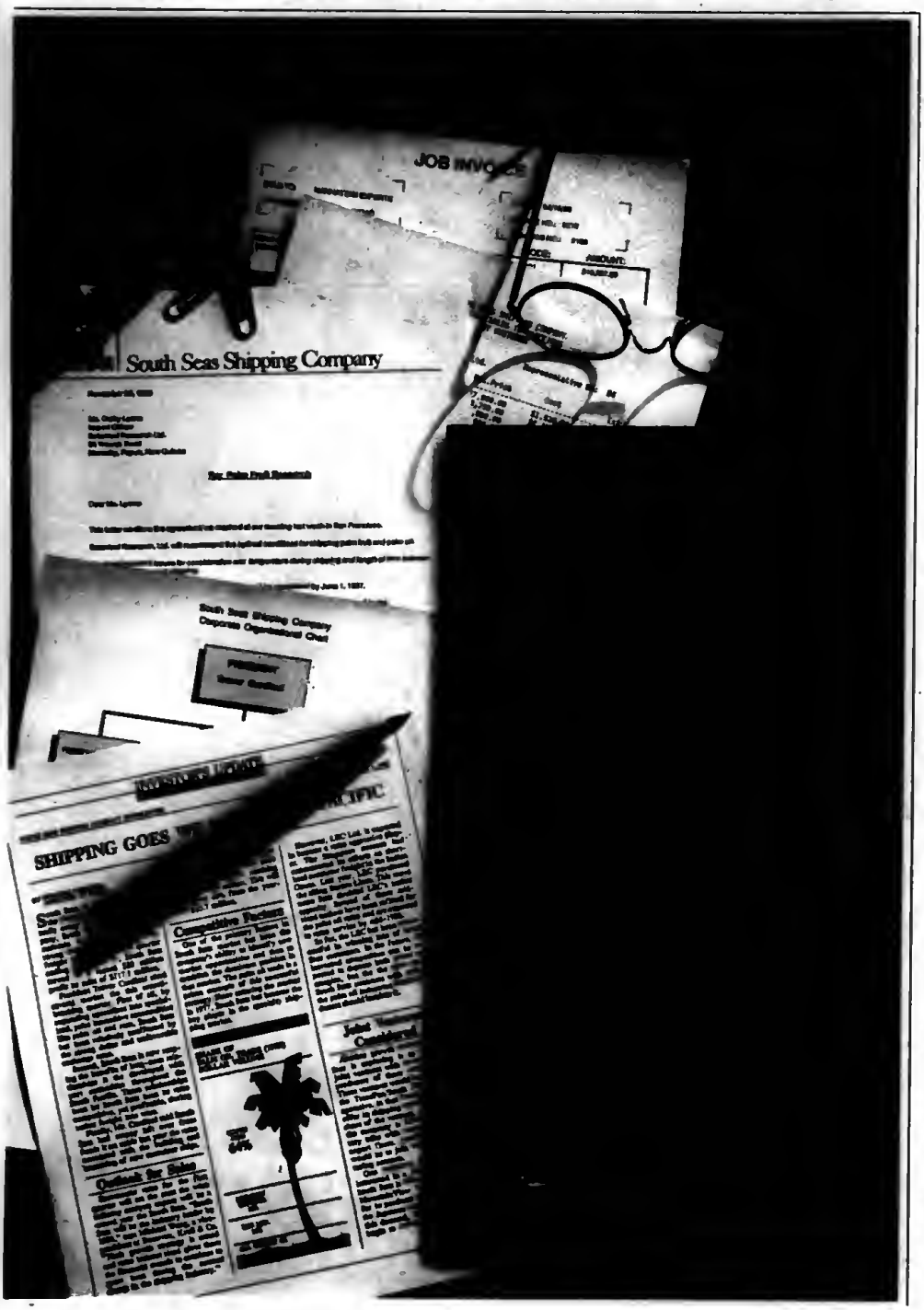
KARTEN from page 52
who typically consider an application complete as soon as they plug in the final formula. Many errors stay hidden until they contribute to an ill-advised business decision; some remain undetected forever. If managers are to place any confidence in computer-generated results, they will need to understand the techniques for validating an application's integrity.

Information center managers realize that they will have to adapt if they are to hold on to their jobs and their staffs, and they have begun to change accordingly. The agenda for this year's Information Center Conference, which took place last month in Anaheim, Calif., illustrates their progress.

Conference sessions emphasized issues such as measuring and communicating to top management the benefits that information centers provide. By contrast, the first Information Center Conference, held two years ago, revolved around the basics of information centers and the implications of this thing called end-user computing.

The current topics reflect a growth of both technological and organizational maturity in end-user computing. They also speak to the growing role of the information center and the continued need for that organization.

As John Bucher, information center manager at the University of Kansas in Lawrence, points out, information centers will continue to thrive, because they perform one indispensable role: They come to the aid of users whose needs MIS does not consider important enough to address. "There will always be a need for a group to coordinate training, work with vendors and keep users informed," he says. ■




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still retains overall responsibility for it in his current position.

"A lot of the reason why information centers run into problems," he says, "is that usually the first thing they want to do is go out and beat the bushes for a lot of users." Before long, what they have, he continues, is an overly large group of people who think of the information center as a free resource. "Far better to keep the growth deliberately slow and concentrate on creating some powerful proponents who can help you to sell your programs at budget time."

Budgets often become an increasingly sticky issue for information centers as they mature. The phenomenon is fairly easy to understand if one looks at a few numbers.

In a study conducted during 1985, Crwth Computer Coursewares, a vendor of CBT training programs, found that more than two-thirds of all mature information centers — those that have been around for more than three years — support more than 200 users. In contrast, more than half of all pilot information centers — those that are less than 1 year old — support fewer than 25 end users.

As an organization's end users increase in number and diversity, the number of tools and trainers it must acquire to support them must also increase. What's more, mature information centers generally retain responsibility for supporting mainframe applications users, whereas younger centers deal only with micro users.

All information centers, according to AMA's survey projections, face a 24.1% increase in their training loads during 1986, with the heaviest burden falling on mature centers. Well-established information centers, the report says, will soon encounter a second wave of training requests, "more sophisticated than the first and more central to the organization's business function."

That the budgetary implications of this phenomenon are not always expected or welcomed by those with sign-off responsibility becomes clear when one speaks with information center managers like Terry Hart. Hart heads up a 4-year-old, six-person center serving a user population of 350 to 400 in Upjohn Co.'s Division of Medical Affairs in Kalamazoo, Mich.

To justify requests that she makes for additional staff members, Hart needs to remind upper management that the firm's user base is not standing still. "Even though our number of users

Continued on page 56

# *Utility's info center frees DP staff for sophisticated projects*

## *Chargeback setup spurs users to solve problems*

By MICHAEL SULLIVAN-TRAINOR

At San Diego Gas and Electric Co., the data processing department has not only recognized the legitimacy of the information center, but managers there use the center to free department programmers for strategic DP tasks.

"Because of the information center, the end user is able to do tasks that we had to provide in the past," says Tom Ilas, Information Systems supervisor. "We used to have to be a jack-of-all-trades, taking the applications idea, developing it and working with end users to define the requirements. Now users identify the need and develop the actual business case, as well as the detailed requirements for new systems."

As a result, the data processing staff has been freed from what Ilas calls "basic" backlog items such as reporting from the data base. Instead, programmers can spend their time on more sophisticated projects — like refining the data base or developing a complex tracking application — that will increase the productivity of the company as a whole.

> ***Users understand that they pay more to have data processing develop their applications than to do it themselves.***

San Diego Gas and Electric's data processing department, called Information Services, is an IBM shop utilizing a full chargeback system. Users pay for every service, including mainframe usage, workstation or personal computer operation and disk storage space.

The charges are made in the form of rates for each type of service. Labor costs for data processing staff time spent developing applications and information center training courses are directly reflected in the end user's bill.

However, the information center staff's time, with the exception of training, is considered part of overhead, along with other indirect data processing costs, and therefore is not apparent as a line item on the user's monthly bill. Instead, overhead is spread across the rates for each type of service.

Chargebacks for DP services are used as incentives for the end users to work through the information center to learn how to access the data base or develop applications prototypes themselves.

The impact of this, according to Ilas, is that users understand that they pay more to have data processing develop their applications than to do it themselves.

With the chargeback system, Information Services is required to track the computer usage for different types of computers and programs. The results of this tracking are reported back to end-user managers, who have the responsibility for cost-justifying the usage of computer services.

"We don't attempt to be the policeman, we try to be the traffic cop. We try to direct people to the services we think are consistent with our architecture and strategy," Ilas explains.

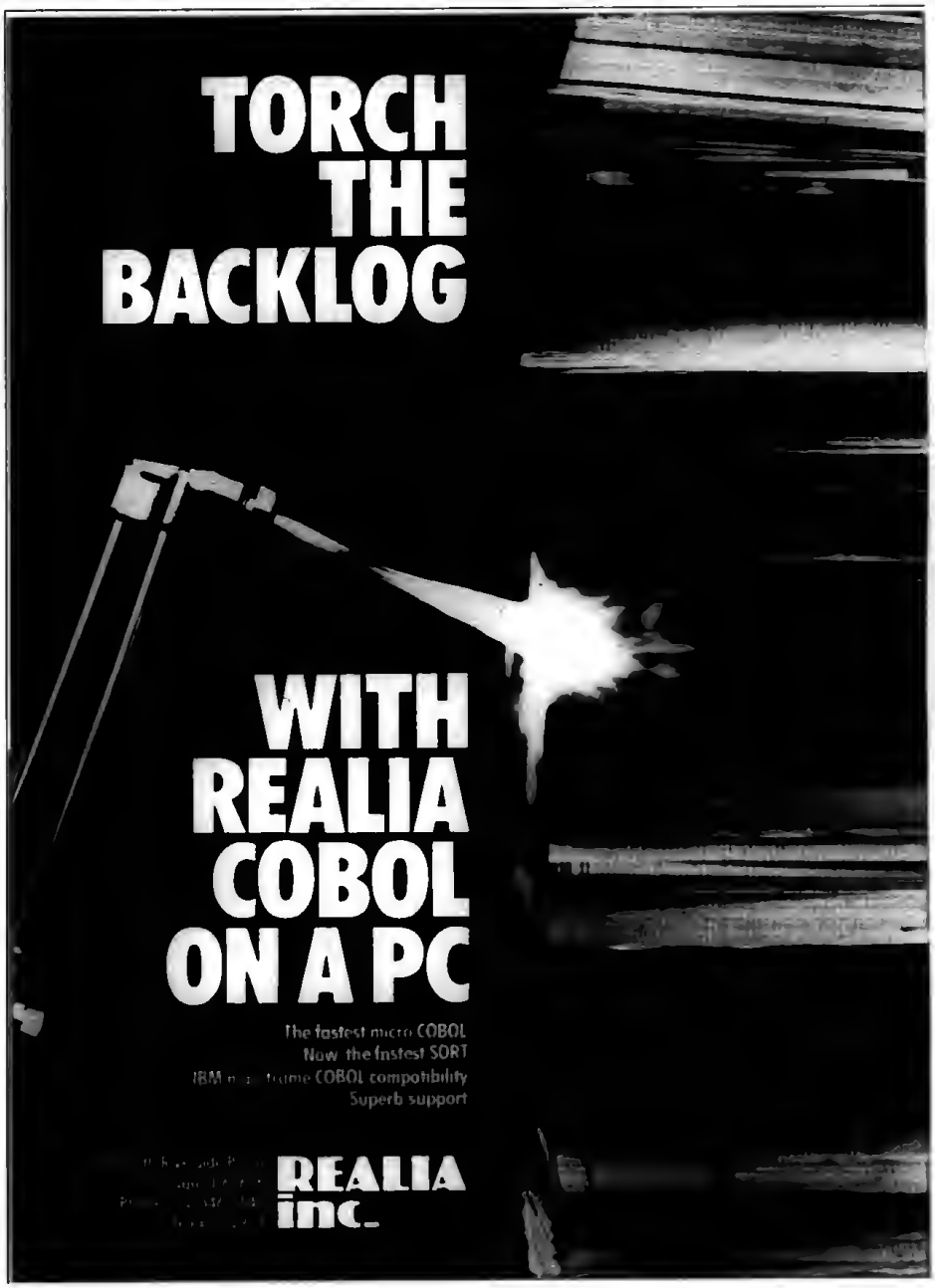
The information center's 12-person staff supports about 2,500 users who operate workstations, terminals and personal computers to run a wide range of applications from electronic spreadsheets to engineering and accounting studies. With their equipment, users can access two IBM 3081s, one of which runs the VM operating system and the other of which runs the MVS operating system.

IBM's TSO is used to allow workstations and personal computers to communicate with the mainframes. There are about 1,200 workstations and 230 IBM Personal Computers located within the company. Eighty percent of the PCs operate as standalone devices.

A consequence of giving the users so much freedom is that an overzealous user can spend his department's budget and the information center's resources automating a process that should not have been automated in the first place. In these cases, upper management can place the blame on the shoulders of Information Services, despite the chargeback system.

"Management sometimes looks to Information Services to say that all the systems work is cost-justified," Ilas says. "We're saying that a lot of that is now under the direct scrutiny of a line function." ■

*Sullivan-Trainor is a* Computerworld *senior writer.*



Continued from page 54

hasn't increased substantially," she says, "the number of calls for help that we're getting has continued to climb . . . and so has the variety of requests."

In the past, budget battles usually involved information managers answering to DP/MIS managers, but the scenario now seems to be changing. According to the AMA's Greenberg, the organization's survey this year showed a trend toward budgetary independence for information centers. Thirty-eight percent of all respondents indicated that their budgets were on a separate reporting line from the DP/MIS department.

Independence may, however, turn out to be a mixed blessing. Despite all the grumbling that information center managers have done about territorial jealousy on the part of MIS departments, they may find that justifying themselves to corporate management is actually a lot harder than they might have imagined.

In a report based on its 1985 survey, Crwth Coursewares noted that top management's resistance to information centers actually increased with the age of the centers. The number of mature information centers reporting management resistance as an obstacle was 11% higher than the number of pilot centers making that complaint — 38% to 27%.

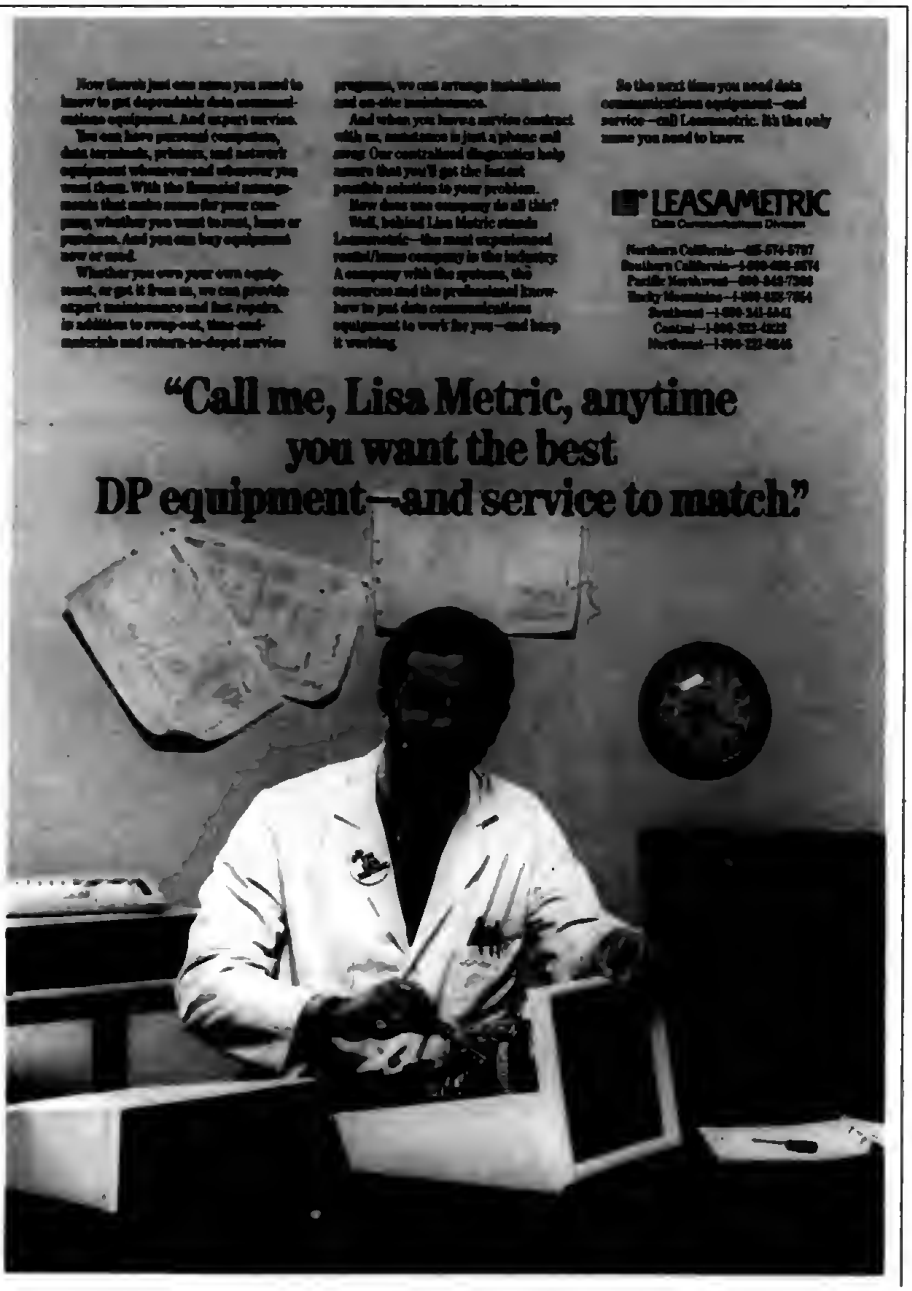
The response surprised the report's author, Beatrice Garcia, director of marketing at Cwrth. "We had expected there would be more management acceptance of information centers as they matured and proved themselves valuable," Garcia says.

But information center managers never had an easy time documenting value, a problem most likely complicated by their technical backgrounds. "Information center managers tend to come from data processing rather than business," Garcia notes, "and, as a result, don't tend to think in terms of business plans."

## Two ways to justify a center's existence

To improve their chances of coming out on top in business negotiations, information center managers often transfer to end users some of the responsibility for justifying a

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# *Centers prove their worth*

## *Managers keep close performance records*

Even though their efforts rarely translate into anything as concrete as budget and staff increases, many managers of mature information centers keep strict records to document their staff's performance. Individual managers recommend a variety of different measures.

"We don't really do cost/benefit analyses," says Katie Kuryla, project manager of the 3-year-old information center at Ryder Truck Rental, Inc. in Miami. "What we do talk about a lot is whether we can show that people are becoming more effective by looking at hiring rates."

She does not tally specific numbers, preferring to offer end-user departments general evidence of the information center's usefulness. Kuryla might point out to a department head, for example, that widespread use of personal computer programs may be one of the reasons his department has been able to forestall some staff increases.

In addition, she has taken note of the fact that in Ryder's finance department, where users started developing some of their own applications after information center staff members taught them how, the demand for APL programmers has declined. Kuryla says she would not feel comfortable tying the decreased demand directly to the information center's work, and she has never used it as an argument for the center's effectiveness. But she knows her staff is in some way responsible.

Kuryla concedes that Ryder's information center probably suffers from less bottom-line pressure than many of its peers. She meets quarterly with an executive review committee, composed of the company's top managers, which approves budgets for both MIS and the information center.

The attitude of these managers is not one that demands a heavy sell, she says. "It is a given here that end-user computing is good."

Ed Katterson, vice-president and manager of the 3-year-old information center at Manufacturers National Bank of Detroit, structures his cost analyses a bit more rigidly. For the past two years, Katterson has compiled a lengthy activities and benefits report to document the information center's value to individual users groups.

The report, a 50-page condensation of information collected through interviews, lists end users' major computing activities and details the benefits the users feel they derive.

Interviewers ask their subjects to calculate benefits in dollars whenever possible. They point out, for example, that the amount of time a fourth-generation language saves a manager is worth a specific amount of money to the firm, and they urge the user department to calculate an approximate figure. Interviewers

also allow users to indicate intangible improvements like increased productivity and better decision making.

Katterson summarizes information from the interviews in various ways. He totals the sums of money that each user department saves and highlights the major functions being performed with the assistance of the information center staff.

Although his immediate boss and his boss's boss get copies of the full report and occasionally comment on it, Katterson feels that the summaries are his most useful documentation tool. Copies of the sections that deal with individual departments are sent to those departments, where managers sometimes use them to justify requests for additional computing equipment.

Dale Delaney, associate manager of the 3½-year-old information center at Cordis Corp., a manufacturing firm in Miami, prefers a different sort of documentation. She relies heavily on telephone logs that track the number and type of problems that her information center staff members solve for users.

Staff members log information in a variety of ways, depending on the seriousness of the user's problem:

- For problems that get resolved over the phone in less than 15 minutes, staff members simply note the user's department, the type of problem and the suggested resolution.
- For any situation that requires more extensive attention, they enter into an on-line tracking system more detailed information about the work they have performed. The tracking system runs on a central mainframe and serves all MIS groups — not just the information center.

Every month, Delaney summarizes the data entered into the on-line system according to the system involved, the type of problem, the user department and the amount of time spent in problem resolution. She presents these summaries to management to show what the information center does and how well it performs.

Such detailed reports cut both ways, however. They sometimes further the information center's budgetary goals, Delaney says, but are more apt to raise questions about why the center took so long to resolve a specific problem.

Terry Hart, who heads up a 4-year-old center at Upjohn Co.'s Division of Medical Affairs in Kalamazoo, Mich., also uses telephone logs. Keeping track of help-line calls actually serves two purposes, she says.

First, it can help justify the information center's operations, Hart says. "With this kind of record, although I may have to do some estimating, I can come up with pretty accurate figures on the amount of time we're saving for users."

Second, the logs help indicate system problems. A pattern of calls concerning a word processing package, for example, might point to bugs in the software. Hart checks the logs every month to uncover such glitches; when she finds one, she alerts the MIS group that is responsible for maintaining the program's operation.

> ***Detailed reports cut both ways. They sometimes further the information center's budgetary goals but are more apt to raise questions about why the center took so long to resolve a specific problem.***

Delaney says that even with records, information centers have a hard time proving their effectiveness.

"And that," she says, "is one very good reason for concentrating on areas that are company goals. That's how you get good visibility."

Eric Rolfe Greenberg, project manager for the American Management Association's "1986 AMA Report on Information Centers," says other common measures for impressing top management include the following:

- Comparing the cost of applications developed by programmers against the cost of those developed by end users who have received help from the information center staff.
- Counting the sheer number of applications that users develop for themselves.
- Tracking staff reductions that can be attributed directly to the rise in end-user computing.
- Showing increases or decreases in the amount of CPU time that end users log before they come to the information center and the amount they log afterward. Increases might indicate that the information center has chosen a software package that users like and feel comfortable with. Decreases may prove that users are becoming more efficient at a specific task.

Greenberg says he has even encountered one organization that counts keystrokes and removes equipment if users do not meet specified quotas. But, he adds, very few information centers attempt that degree of regimentation

— JOANNE KELLEHER


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Continued from page 56

center's existence and maintaining its funding.

One of their main means of delegating responsibility is a chargeback policy, wherein user departments pay for the equipment they use, the support and training they receive and, frequently, a share of the center's overhead. The second method is to cultivate proponents at top management levels.

Chargeback policies are gaining popularity, because information center managers regard them as a means to both shift the onus of justification away from themselves and reduce the amount of nonproductive user requests.

In its 1986 report, the AMA notes that about half of the information centers it contacted in a similar study a year earlier relied on chargebacks to help cover the cost of hardware and software purchases. One-third charged user departments for installation and hookup costs, and one-fourth billed users for data storage, mainframe connect time, maintenance and repair. Some also charged user departments for overhead and consultation time.

As convenient as chargeback seems, it can pose a tremendous risk: The transition from free access to fee access can be a politically tricky passage.

One information center, whose former manager requests anonymity, was quite literally killed by the backlash. In this case, the center never operated as a free service but rather began its existence as a profit center. Nevertheless, the fact that no MIS group in the firm had ever allocated costs for anything but raw computing power was enough to make the idea "political dynamite," according to the center's manager.

"People were used to being charged for processing but not for development or consulting," the manager says, "and it was perceived as a strange way to operate."

About a year and a half into its existence, the information center lost its toehold and "got dropped off the bottom of the list," the manager says.

The center had run popular training programs and made some decent money, with fees on the order of $50 per hour for consulting and $100 per hour for development. Considering these successes, the manager deduced that users' opposition to the chargeback system was the only possible cause of the center's demise. "At the time," he points out, "there was still considerable uproar from people who objected to being charged."

IFF's Faistl says his company's users would show the same resistance if he tried to institute a chargeback policy for information center services.

In theory, Faistl is already a proponent of chargeback. "Users should justify the information center, instead of the information center having to prove its own worth," he says. "Besides, unless you can get into the mode where you are charging back, users are going to think of you as a free resource and use you accordingly."

But, practically speaking, he cannot see the concept working for the information center under his supervision — at least not yet. "If we implemented a chargeback system now, it wouldn't be regarded as a positive thing," he says. "It would be viewed as taking money out of our right pocket to put in our left."

> ***'The best thing an information center can do to keep the heat off itself is to let the users become its proponents.'***
>
> — Don Faistl
> International Flavors and Fragrances

Perhaps by next year, when the center will be 4 years old, Faistl says, it will have grown enough and become established enough to overcome resistance to the idea of chargeback.

Katterson at Manufacturers National Bank of Detroit was delivered from the necessity of worrying about acceptance. Just as he began to consider charging users for information center services, the bank's top managers announced a companywide policy of cost accountability.

The system has been in place since Jan. 1, and Katterson already notices a slowdown in user requests. Results are not so pronounced in the ledger books, however. Training and consulting revenues, combined with a base fee per user, still fall short of the center's original expectations. "We're still not getting enough to meet costs," Katterson says, "so we still have some tuning to do."

Another, albeit partial, solution to the problem of justifying an information center's operations is to cultivate partisans in end-user departments. "Information center managers need to get out and practice some management by walking around," says consultant Livingston. "What they want is to establish a foothold in some department and find a champion there."

IFF's Faistl calls them proponents, but the idea is the same. "The best thing an information center can do to keep the heat off itself is to let the users become its proponents," he says. "Tell them to make sure their bosses know how whatever you are working on has helped them. That

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way, when it comes time to pay out some pesos, there is already an awareness of how effective the information center has been."

By the time information centers have reached maturity, many managers discover the value of word of mouth.

Ryder's Kuryla, for example, credits end users with a large measure of her information center's success. "People in end-user departments have been pretty effective in telling their managers how wonderful it is," she says.

And Goodyear Aerospace's Uecker makes sure that both he and his staff wander around in user departments to pick up information about employees' needs and to cultivate an awareness of the information center.

Information center managers can and should apply the same principle to upper management, according to consultant Casto of the Casto Group. If the centers hope to remain vital, he says, they must find ways to foster liaisons within their companies' business units and to make direct contact with top executives.

> ***The risk with chargeback is that the transition from free access to fee access can be a politically tricky passage.***

Casto suggests one method that not only allows information centers to gain positive visibility but also helps them decipher strategic corporate goals: hosting a series of executive seminars. These events should not focus on recitations of information center successes but should provide top managers with just what they need to know about the risks and exposures associated with end-user computing.

As a side benefit, executive forums can provide information center managers with insights into possible new markets for their services, Casto says.

He and many other observers believe that information centers are most likely to falter when they make the mistake of defining end-user computing and their charter in connection with it too narrowly. "They let themselves become so overrun with user demands," says Casto, "that they can't see the strategic view for all the users in front of them."

IFF's Faistl shares the opinion. He maintains that the information center can and should serve as the focal point and direction setter not just for micros, but for mainframe-based end-user computing, office automation and systems development as well.

His convictions, in fact, prompted him to retain control over the information center when he got promoted to manager of information resource planning. "I've know for a long time," he says, "that that's where the action would be."

Rocco Maggiatto, a vice-president and manager of information and data management services at Marine Midland Banks, Inc.'s corporate office in New York, recently reached a similar conclusion.

Marine Midland's information center, established five years ago, encompasses a broader scope than most departments that operate under that title, Maggiatto says. With a staff of 40 employees, the center handles acquisition, installation, training, decision support consulting and maintenance negotiations for personal computers, office automation workstations and time-sharing terminals and administers an extensive electronic mail system.

Although Maggiatto favors the concept of a broad charter, he says Marine Midland's information center may have gone a step too far. He feels that the time has come for the center's staff to apply its know-how more selectively.

As the center established itself as a far-reaching concern, he explains, it began to get bogged down in the piles of administrative paperwork that seem to go hand in hand with end-user computing. The bureaucracy started becoming so cumbersome, in fact, that users began to view the information center as an obstacle rather than an aid.

In turn, Maggiatto has begun to rewrite the center's charter, turning the organization into an engine for several targeted, strategic efforts. Under his direction, he says, the information center will "establish a strategic framework for engineering the workplace, establish a data management framework and provide support within a common framework to a variety of mini information centers that have sprung up throughout the bank."

The priorities now, Maggiatto says, are projects such as figuring out what users do with data and how they can do it better. He is careful to note that, because of its broad background, the information center at Marine Midland is probably more qualified than most to take on such a pivotal role.

Still, Maggiatto's plans for his company's information center closely resemble what many observers see as the inevitable route for these entities. IFF's Faistl states the matter succinctly: "The information center is changing its role, moving away from direct responsibility and toward orchestration." ■




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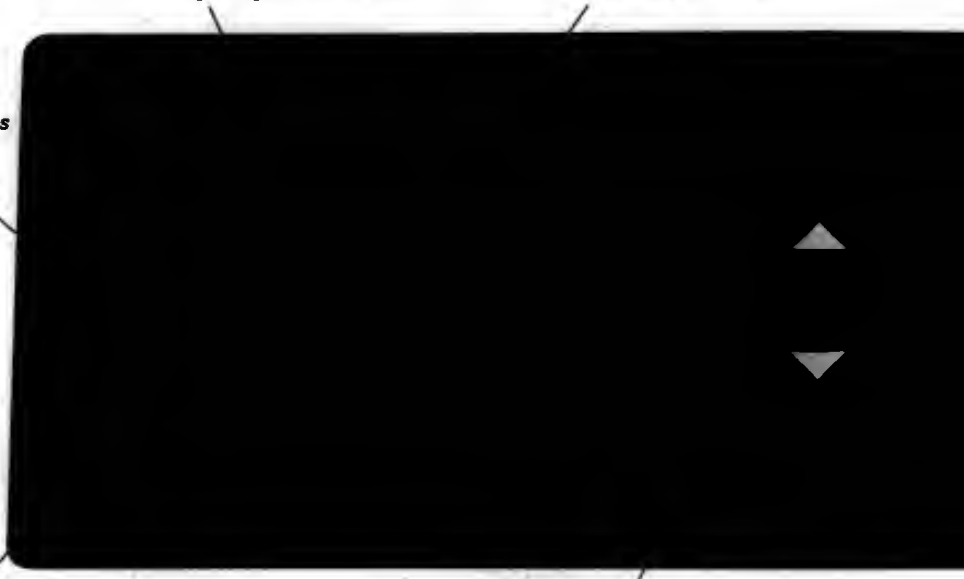
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# How to maintain quality as the center assumes new roles

By FRED L. FORMAN and GARY A. CURTIS

As an information center moves into maturity, it needs to own up to the fact that it cannot be all things to all end users — that it needs to set limits as to the quality and quantity of service that it can provide.

The following four guidelines will help keep any growing information center on track:

**1. Keep tabs on users' changing needs.** In its start-up phase, an information center can easily satisfy the needs of the few users who want help. As the center attracts more users, however, staff members find it more difficult to meet everyone's needs.

Three concrete actions will help the center remain responsive:

- Institute a help desk to meet the demands of the growing user base. The desk should be staffed by information center staff members who enjoy solving users' pressing problems.
- Publish a newsletter to dispel users' technical fears and promote goodwill. Newsletters are also the perfect medium for showing off what's new in the information center: new data bases, new development tools, increased storage capacity and so on.
- Conduct monthly meetings to bring together information center staff members and their end-user clients. Two-hour meetings — with one hour devoted to presentations from the staff and one hour free for questions from the floor — work especially well.

**2. Charge users for services rendered.** Like any other business sector in a company, the established information center must demonstrate to top management its ability to meet financial and performance goals and to provide cost-effective service. It can acomplish neither if it works for free.

Maturing information centers need to institute fair charges, based on actual usage.

To ensure that the center bills its users fairly, managers should compare their prices with those charged by commercial service bureaus. The two should be about the same.

**3. Build everything around a strategic plan.** A strategic plan sets forth the information center's mission by depicting the center as a business organization within the corporation.

As such, the plan should encompass every aspect of information center management: budgets, financial goals and projections of client needs as well as hardware, software and networking concerns.

Without the solid foundation of a strategic plan, an information center is little more than a hodgepodge of software and files and can never reach maturity.

**4. Stay on the edge, but don't go overboard.** New products show up all the time, and information center managers always feel tempted to load up on tools.

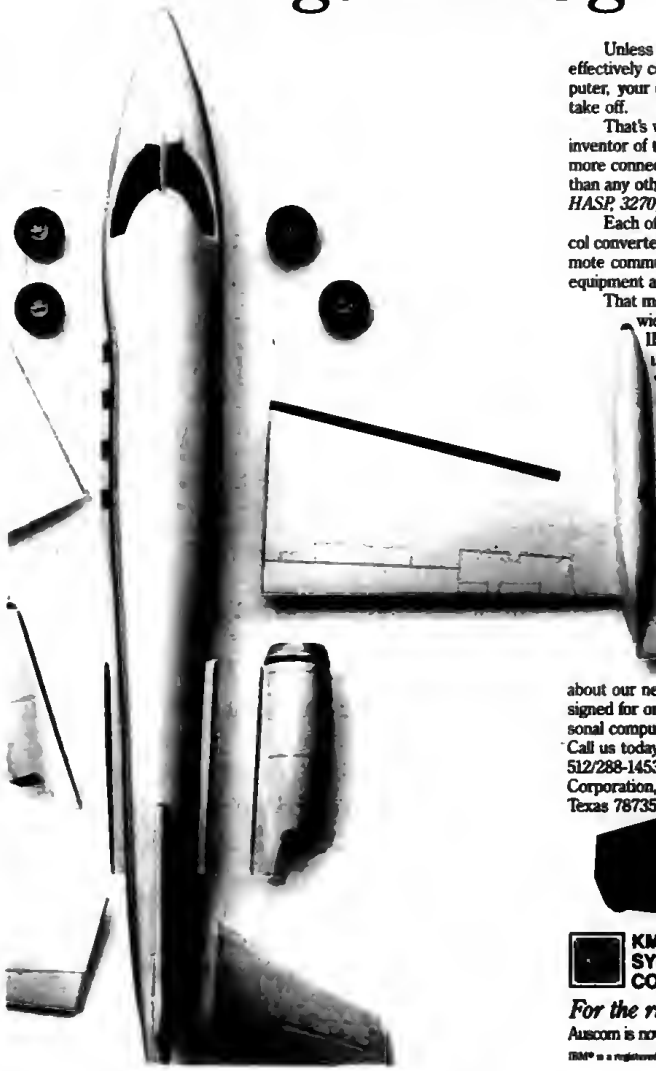
Users, on the other hand, invariably cling to the one or two products they like and show a reluctance to try new ones.

Managers of maturing information centers should take steps to alert and inform end users of new products and their potential benefits.

The only products approved for use, however, should be those whose capabilities can change the way users conduct their business and improve the bottom line. ■

*Forman and Curtis are vice-presidents in the Corporate Technology Group of American Management Systems, Inc., a consulting firm based in Arlington, Va.*

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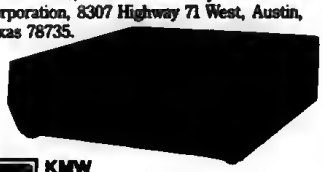
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## In Depth

### Case History

# E. F. Hutton: MIS, end users unite to take on Wall Street

By ALAN ALPER

In the mid-1970s, E. F. Hutton & Co. realized that a corporatewide information system could not continue to grow haphazardly. So the 82-year-old brokerage house took painstaking efforts to plan its communications and computing architecture from the top down, creating an information systems network spanning its regional and branch offices worldwide.

In essence, recalls Bernard Weinstein, E. F. Hutton's vice-president of communications, branch information systems and programming, the firm wanted to create "one network for information flow," enabling all 18,000 employees to have access to data relevant to their jobs.

"We didn't want a piecemeal approach — something that would put a finger in the DP dike," he notes. "We wanted an architecture for the long haul."

Moreover, E. F. Hutton hoped to increase the productivity of its account executives by 50% within three years, Weinstein adds. "We wanted the system to be used as a competitive weapon," he asserts. "Some companies just talk about it, but we wanted to do it."

In a departure from the day's prevailing wisdom, the firm established committees — groups composed of corporate users and information systems specialists — to identify long-range requirements. By incorporating the input of relatively unsophisticated users and knowledgeable professionals, E. F. Hutton hoped to avoid being saddled with obsolete equipment — a situation to be averted at all costs in the fast-track world of Wall Street.

The committees' recommendations particularly emphasized remaining flexible enough to take advantage of any technological opportunity that arose. Required was an all-encompassing system that would enable users, regardless of their location, to access a multiplicity of data in real time.

Data such as on-line stock quotes, financial news, analytical models and research reports had to be available at the stroke of a key or two. In addition, the system had to perform a variety of office automation tasks, such as word processing and electronic mail for executives and support personnel.

> ***'Some companies say, "Just put some PCs on people's desks and build support behind it." We built the support first and made it flexible, with enough capability to suit our needs for some time.'***
>
> — Bernard Weinstein, E. F. Hutton

#### More control at the right time

In light of E. F. Hutton's guilty plea to U.S. Department of Justice charges last summer of inappropriately maintaining its checking accounts (see story page 66), perhaps the firm's automation strategy was too effective in helping to hone that competitive weapon.

But, like its competitors, E. F. Hutton was seeking to provide management with a better way of exercising tighter controls over the firm's assets and monitoring the performance of the various financial services it provides to its customers.

"The issue is how to provide better control and report capabilities to give management a better view of how policy is executed," notes Marshall Caro, chairman and chief executive of Programit, a New York data processing consulting firm that has worked with many financial concerns on Wall Street, although not with E. F. Hutton.

Adds Weinstein, "We're looking to improve the time and place value of the information. It's more useful to our people if it is in the right place at the right time."

Because E. F. Hutton is a retail-oriented brokerage house, meaning much of its revenue is derived from individual investors rather than institutions, efficiency is pivotal. As the variety of financial services that brokerages offer broadens to include mutual funds, municipal bonds and money market accounts, the competition for individual investors has heated up, forcing E. F. Hutton and its peers to attempt to provide their brokers with an automated advantage.



CW PHOTO BY DEBORAH FICKLING

"You can't have a broker running to the back office for a Standard & Poor's report or going to the other side of the office for news and then having to call one of our research analysts while he has a client on the phone," Weinstein explains.

"We wanted to make it easier for our people to find data within the monolith of Hutton. What we had was similar to going to the library and wanting to find something without the Dewey decimal system."

So E. F. Hutton constructed a four-level hardware and software environment tied together via a private terrestrial network and satellite communications system. Hardware consists of a host and alternate site complex of IBM 3080 and 3090 mainframes; Data General Corp. Eclipse and MV minicomputers at regional and branch offices, respectively; and soon-

*Alper is* Computerworld's *Mid-Atlantic correspondent.*

> ***'We've sugar-coated the whole thing, so users can use as much data as they want. There's a bypass button, so if an individual wants some type of data, it will go right to his in-box. Users won't even have to look at it on the screen.'***
>
> — Bernard Weinstein
> E. F. Hutton & Co.

to-be unveiled IBM Personal Computer-compatible workstations to replace decade-old Bunker Ramo Corp. dumb terminals.

The workstations will provide local processing capability for 10,000 brokers and executives.

When work is completed, the $3.1 billion brokerage firm will have spent $100 million on the project. The purchases will include workstations, a satellite system, office automation software for the branch offices, software licenses and system maintenance, Weinstein says.

One hundred million dollars, he adds, is not a lot of money when you consider that the firm spends that much annually on its telephone calls.

"The $100 million was spread out over seven years," Weinstein explains. "A typical firm spends approximately 1% of sales on its DP budget. But, for us, since we're more information-dependent, we have to spend more."

#### History of decentralization

In 1978, its IBM mainframes already in place at a host complex located in the heart of New York's financial district, E. F. Hutton was looking for a way to provide more powerful processing to its regional offices without siphoning capability from its headquarters facility.

The firm installed DG Eclipse minicomputers at its 20 — now 40 — regional offices, representing what it says was the first distributed DP system on Wall Street.

"It was a tremendous departure from what was going on," Weinstein explains. "IBM had not recognized distributed data processing — its approach was to build up the host."

In early 1984, E. F. Hutton further decentralized its DP load by installing DG's MV-class machines, running DG's Comprehensive Electronic Office (CEO) software, at its branch offices (see story page 69). Called the Branch Information Processing System (BIPS), the computers provide local office automation and DP functionality.

The various mainframe and minicomputer systems are connected via a private leased terrestrial line, which permits communications at speeds up to 19.2K bit/sec. Via the network, known as Compass, brokers and executives can maintain real-time access to stock quotes, a variety of technical analyses of securities, portfolio performance, customer account information and E. F. Hutton's own financial news service as well as the Dow Jones News/Retrieval service.

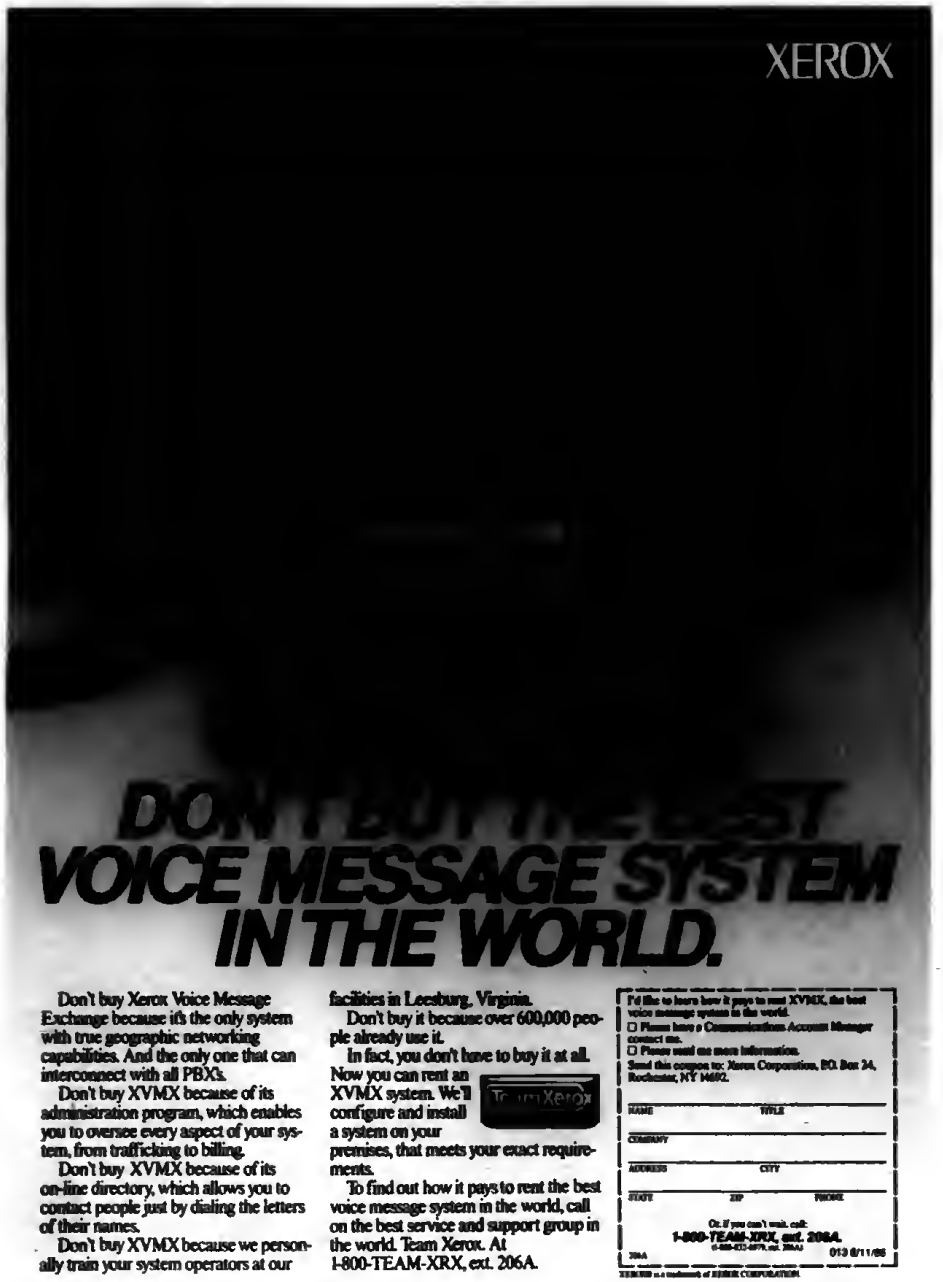
For security reasons, data applicable to each E. F. Hutton office is available only to that facility. Each user has an identification code that enables him to gain entry to the system. Each employee also has a password to allow access to job-specific data.

"A cashier, for instance, would have reason to get at certain data. His user ID and password, however, would only work on his machine. He can't log on using an account executive's machine," Weinstein explains.

Access to the network will also change when E. F. Hutton installs the 10,000 IBM PC-compatible workstations. At press time, the company had not disclosed the name of the vendor that will supply the workstations, which will also run DG's CEO.

Dubbed Advanced Workstation for the Executive (AWE) by the firm, the microcomputer-based workstation will enable brokers and management alike to run Lotus Development Corp.'s 1-2-3 as easily as they access the E. F. Hutton data bases.

AWE will provide graphic



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presentations of stock market data and will be easier to use than the Bunker Ramo terminal it is replacing. Such ease of use will not only facilitate what employees are already doing but also will open new vistas.

The workstation will enable brokers to access information, such as the Securities & Exchange Commission's listing of insider trading, that previously was technologically infeasible.

"We've sugar-coated the whole thing, so users can use as much as they want. There's a bypass button so if an individual wants some type of data, it will go right to his in box. Users won't even have to look at it on the screen," Weinstein says.

"You can do things with one button on a PC that take numerous keystrokes with the Bunker Ramo terminal," he adds, pointing to the access of E. F. Hutton's analysts' reports as an example. "Because the PC's intelligent, it also tells you when you've hit the wrong key."

Weinstein says that unlike other brokerage firms, E. F. Hutton did not jump on the PC bandwagon because it was in vogue.

"Some companies say, 'Just put some PCs on people's desks and build support behind it,' " Weinstein explains. "We built the support structure first and made it flexible and modular and with enough capability to suit our needs for some time."

Toward that end, E. F. Hutton has also recently embellished its communications infrastructure. It is in the final throes of installing its own satellite communications system to transmit voice and data to all of its 404 locations worldwide.

At each location, E. F. Hutton is installing a 2-foot, $2,000 satellite dish supplied by Equatorial Communications Co. in Mountain View, Calif., and has purchased its own transponder at a cost of $2.5 million. Voice and data are transmitted over C-band, a bandwidth not affected by sunspots or atmospheric conditions, Weinstein notes. The brokerage firm is using Spread Spectrum, an encryption technique that prevents computer pirates from decoding or jamming the signals being sent.

At a total cost of $3.5 million, Weinstein says, the satellite communications system paid for itself within the first six or seven months of operation.

"Over 30% of Hutton's traffic is of the broadcast variety," he explains. "We found that it's more cost-effective to send data and voice to all of

## BIPS abuses close loopholes

**It was E. F. Hutton & Co.'s Branch Information Processing System (BIPS) at which the U.S. Department of Justice pointed an accusatory finger when it charged the brokerage firm with federal mail and wire fraud violations that concerned the way in which certain checking accounts were maintained from July 1980 through January 1982.**

**While E. F. Hutton pleaded guilty to the charges and paid a $2 million fine plus $750,000 to cover government investigatory costs, many observers contend the scandal was a poignant illustration of a strategic use of information systems.**

**Bernard Weinstein, E. F. Hutton's vice-president of communications, branch information systems and programming declines comment on the situation.**

**E. F. Hutton insiders, however, say that in theory, BIPS' drawdown facility should have prevented managers of the broker dealer subsidiary from maintaining zero or in some cases negative balances in the checking accounts in question — a situation that freed additional assets for investment purposes.**

**"There were loopholes that enabled managers to circumvent the accepted procedures," recalls one E. F. Hutton source who asked that he not be identified. "It was a problem of lack of controls."**

### Changes, more control

**Hutton has since enhanced BIPS' cashiering and draw-down facilities to prevent further abuses. Better management controls have also been instituted, enabling corporate executives to monitor the cash position of each branch's accounts, sources say.**

**"Each branch used to operate as an independent entity," one source explains. "Now, each is audited much more closely."**

**According to Paul Beehler, Hutton's senior vice-president and treasury manager, the brokerage made a number of organizational changes as well as modifications to BIPS to prevent the improprieties from recurring.**

**First, the firm established a formal treasury function under Beehler that reports directly to the chief financial officer. "We moved to a central treasury management philosophy from a decentralized one," Beehler says, a move that enabled the corporate suite to more closely audit the firm's cash position.**

**Also employed was a computer facility that enabled Beehler to monitor the firm's daily cash flow of more than $1 billion from the firm's 400-plus branch offices to its New York treasury department.**

**"In addition, we developed a system that controls and tracks all aspects of Hutton's relationships with the various banks that it does business with," Beehler says.**

**— ALAN ALPER**




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our locations in one transmission."

Among the various communications sent via satellite are E. F. Hutton's "Morning Market Letter," which updates brokers on stock market conditions, and "Profitline," a pep talk covering sales strategies and economic conditions. "At 48K bit/sec., the voice on 'Profitline' sounds real good, not like Mickey or Minnie Mouse," Weinstein says.

E. F. Hutton even uses the satellite to transmit software updates to all of its regional offices. Rather than risking sending numerous tapes through the firm's internal mail, one satellite transmission ensures that each location has received the new software, he adds.

Citing prohibitive costs, the firm does not intend to transmit video via satellite. "Although it's very sexy, it's also very expensive," Weinstein says. "If there were a breakthrough in the economics of satellite conferencing and the technique could be sold as a substitute for travel, we'd consider it. But it's obvious that people still want to go eyeball-to-eyeball."

With the system's infrastructure in place, E. F. Hutton is looking to further optimize its communications by using local-area networks within its branch offices.

While a decision has not yet been made, Weinstein is leaning toward AT&T's Starlan network because of its speed, simplified cabling scheme and compatibility with software already in use, such as Lotus products and other IBM PC-compatible software. "We would like to install it when we roll out the AWE workstation in first-quarter 1987," he says.

### Software and AI

E. F. Hutton employs 200 programmers, although the firm does not attempt to write all of its own code, Weinstein says. The brokerage house uses many off-the-shelf packages, some provided by small software vendors, and adapts them to meet its own requirements.

"We used to do all our own programming in-house, but now we use a lot of software vendors and some of the small boutiques where much of the more creative work is done," Weinstein says.

Although risky, Weinstein emphasizes that E. F. Hutton goes to all extremes with the small software houses to make sure the firm is protected in the event that a vendor goes out of business. "It would be a shame not to use them because they were small," he concludes.

E. F. Hutton is contemplating grafting expert systems capabilities onto AWE. The company is working with Palo Alto, Calif.-based Teknowledge, Inc. on an expert system that would enable AWE, without prompting, to alert brokers to market trends and breaking information that affect securities trading.

"The system would have triggers — such as heavy insider trading on a particular stock, updated market research or breaking news — that will ask the user if he wants more information," Weinstein explains. "It also would be used to lead users through the system. It would improve the utilization of the systems for experts and for those just starting out."

Implementation of the expert system, while evaluated in conjunction with AWE, probably will not occur until after the workstations are put on-line in early 1987. "We've just not looked at it in detail yet, but it probably will be available in some form sometime next year," he estimates.

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> ***'People in this business are inundated with information and have to choose between options presented on the screen. There has to be some mechanism to enhance decision support and make people more effective. You can call it AI or anything you want.'***
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# Strategy, software sway Hutton vendor choice

**Data General Corp., E. F. Hutton & Co.'s supplier of branch and regional processors and Comprehensive Electronic Office (CEO) office automation software, won the brokerage house's contract in February 1983 after a two-year bidding process.**

**Tom Kelly, a member of the DG sales team involved in the E. F. Hutton sale, says DG's bid probably was the highest. DG's advantage, he contends, was its ability to supply all the hardware and software E. F. Hutton required plus a strong systems integration service.**

**Weinstein says E. F. Hutton went with DG initially, in 1978, because of the vendor's distributed DP strategy, an approach that IBM did not recognize at the time. "We looked at the processor costs coming down the pike; line costs, which would not increase as steeply; and the ability to network this all together so the system could all work in concert."**

**Five years after the initial installation, he went back to DG when developing what is now known as the Branch Information Processing System because he wanted "the ability to put DP power at the branch level." He was also attracted by CEO, which he describes as "the most powerful office automation package available."**

**E. F. Hutton's need for a versatile vendor was another factor, Kelly notes. "They wanted to be able to take advantage of technology as it moved forward. Believe me, they've taken advantage of new technology."**

**— ALAN ALPER**

that many Wall Street firms are embracing various strains of what is called AI. "People in this business are expected to make real-time decisions. They are being inundated with information and have to choose between options presented on the screen."

"There has to be some mechanism to reduce the amount of data and enhance decision support to make people more effective. You can call it artificial intelligence or anything you want," Caro says.

### Productivity via automation

Depth of view and committment to an architecture is how E. F. Hutton's automation strategy differs from most companies', says Tom Kelly, a member of the DG sales team that sold the brokerage house the bulk of its computer equipment. "They knew exactly what they wanted; that's very unusual, given what goes on in the industry," he notes.

Weinstein says his firm seeks to increase its brokers' productivity without having to hire additional support personnel. Through automation, "People said that we could add seven more brokers and get more productivity from each without needing any more secretaries."

According to Caro, the goal of many brokerages is to make do with fewer traders. "If you look at it in those terms, it's a classic case of labor automation, although most people don't want to call it that." ■





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# EXECUTIVE REPORTS

# Special Editorial Features

Every issue of Computerworld presents either a Product Spotlight or Executive Report. For advertisers, it's still not too late to take advantage of the hot topics set for September!

**Manufacturing Automation Protocol** (Executive Report, September 1) Takes a close look at the manufacturing automation protocol marketplace (MAP), with a focus on General Motors' use of MAP. Also discusses which vendors are supplying which MAP products. This report will help users determine if the time is right for implementing computer-integrated manufacturing and MAP. Closing date August 15.

**Computer Leasing** (Executive Report, September 8) Focuses on the state of the leasing industry, how vendors are reacting, why leasing can be better than buying and what to expect in the future. Also, an examination of the growth of leasing — plus, pros and cons of leasing versus buying and a look at lease negotiating. Closing date August 22.

**Financial Modeling Packages for Micros** (Product Spotlight, September 15) Examines how standalone spreadsheets are fast disappearing and being replaced by integrated programs or financial modeling packages. The main article looks at what users can do after outgrowing their spreadsheets, and presents the use of a financial modeling package as one solution. Closing date August 29.

**Communication Standards** (Executive Report, September 22) Focuses on electronic data exchange protocol (EDI), which allows for the direct computer to computer exchange of standard business forms. This report studies the value of EDI in the transmission of purchase orders, invoices and other important documents in various industries. Also, a look at how EDI is strengthening the trade relationships between customers and suppliers. Closing date September 5.

**On-line Computing** (Executive Report, September 29) Explores the fact that although on-line transaction processing (OLTP) has been around since the 1960s, the market is now heating up with IBM and some BUNCH companies battling a group of young companies for the bulk of the market. This report examines on-line computing with a look at the major players, the current state of the art, and what users want. Closing date September 12.

And it doesn't stop there! Important and pertinent Executive Reports and Product Spotlights topics continue through October and November.

| ISSUE | TOPIC | CLOSING DATE |
|---|---|---|
| October 6 | Hardware Roundup/Large & Medium-scale Systems (Product Spotlight) | September 19 |
| October 13 | Hardware Roundup/Small-scale Systems (Product Spotlight) | September 26 |
| October 20 | Hardware Roundup/Microcomputers (Product Spotlight) | October 3 |
| October 27 | Decision Support Systems (Executive Report) | October 10 |
| November 3 | *1000th Issue/40th Anniversary of the Computer* | October 10 |
| November 10 | PC Graphics Hardware (Product Spotlight) | October 24 |
| November 12 | *Computerworld Focus on Microcomputing * | October 3 |
| November 17 | Systems Integrators (Executive Report) | October 31 |
| November 24 | Vertical Markets (Executive Report) | November 7 |

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# PRODUCT SPOTLIGHTS

# MANAGEMENT

**TAKING CHARGE**
Donald Prentice

## MIS: Chip off the old block

Today's organizations spend considerable resources trying to overcome chronic problems with the information systems function. Management sees great potential that is not being realized. A wide variety of prescriptions for success are offered, with the common approach of seeking to strengthen the tie between the conduct of the business and the development of information systems.

Often, expectations are not met despite effort and the apparent validity of the prescriptions. The reason is clear when the prescriptions are viewed in the context of a simple, basic principle: Information systems necessarily reflect the character of the organization they support.

MIS is not the organizational problem child, but merely the identifiable patient. The situation is similar to that of young Johnny being brought to a family counselor for therapy because he is disrupting the family and his parents can't do anything about it. It is true that Johnny has problems, but he is not *the* problem. The whole family is the problem. Johnny is the identifiable patient. True therapy begins only when the entire family, including Johnny, owns up to this.

Information systems are not *the* problem. The whole organization is the problem. The real issue is how to redefine the organization in response to present-day business challenges and in alignment with the impact of the infor-

See **MIS** page 72

*Prentice is vice-president of the Information Group, Inc., a Santa Clara, Calif., consulting firm.*

# Ford seeks compatibility

## Exec says unified systems approach spurred IBM pick

**By Alan Alper**

DEARBORN, Mich. — Ford Motor Co. picked IBM to devise a comprehensive office automation strategy for its North American operations [CW, July 28] to address inefficiencies caused by incompatible computer systems, according to a top Ford executive.

Ford said it chose IBM over archrivals Digital Equipment Corp. and Wang Laboratories, Inc. because it felt Big Blue could provide the unified systems approach needed to remedy the situation.

"We felt IBM was best able to meet our requirements," explained S. I. Gilman, Ford's executive director of information systems. "They already have the largest installed base in Ford and are known for their support and service."



Ford's Gilman

If a contract can be negotiated, Ford plans to purchase between $300 million and $400 million worth of OA products and services, including 30,000 workstations, during the next five years. The No. 2 auto maker expects to conclude its negotiations with IBM, which center around terms, conditions and technology requirements, within the next three months, Gilman noted.

While many groups within Ford's North American operation have standardized around specific hardware and software, few can effectively share data with one another, Gilman said. Sales organizations, for example, use Wang systems, whereas credit and engineering organizations use DEC and Fortune Systems Corp. computers, he noted. The balance of computer use within the operation is divided primarily between IBM and Wang.

"We felt we needed to standardize hardware and software around one brand," Gil-

See **FORD** page 74

# Measuring DP efficiency, quality

**By David A. Ludlum**

TAMPA, Fla. — At GTE Data Services, Inc., numeric measurements of the quality of new computer systems and of the efficiency of their development uncovered several problem areas, according to a quality assurance specialist there.

The problems, which included inaccurate reporting of workers' time and a lack of reporting of defects that had been uncovered, were due to insufficient training and a misallocation of resources, said the specialist, Robert Coull.

With corporations tightening budgets and putting greater emphasis on pleasing their computer users, more and more system development managers are turning to quality and productivity measurements such as those used by GTE.

"It's relatively new in data processing because data processing is a new area. It's part of a normal maturization of the profession," said Diane Beal, quality assurance manager at First Data Resources, Inc. of Omaha, a service bureau specializing in transaction processing.

Data processing "is not so much an art anymore," said Beal. "It's something we can look at and quantify."

A recent study by the Quality Assurance Institute of Orlando, Fla., states that numeric measurement of data processing quality and productivity is the most important tool for improving those areas.

"Management in data processing doesn't have the same types of numbers that it has in other corporate operations. They have to make many of their decisions intuitively," said William E. Perry, executive director of the Quality Assurance Institute. "If you don't know your defect

See **MEASURING** page 74

**INSIDE**

Calendar: Shows, conferences, seminars/**73**

**INSTANT ANALYSIS**

*"Once you realize your own limitations, it is only natural for you to surround yourself with men and women of greater capacity than your own. Then, and only then, will exciting things really start to happen."*

**— H. Ross Perot, founder and chairman of Electronic Data Systems Corp., in a speech on "Success in Business" to the Junior Chamber of Commerce in Grand Rapids, Mich.**


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# MIS: Chip off the old block

From page 71

mation revolution.

Information systems are not and cannot be any better or worse than the organizational context in which they function. Their performance is determined by the clarity of purpose, coherence of structure and consistency of operations in the parent organization. In fact, information systems might be revealing a lack of organizational integration rather than causing one.

Various information-oriented prescriptions, such as enterprise modeling and stages of growth analysis, are put forth to improve information systems. But the insights they generate must first be used to change the business and organizational processes. Until this is done, information systems cannot be improved.

**Principle and application**

A few specific cases illustrate the principle and its application:

• A major corporation endured long-term frustration with the information systems function. IBM's Business Systems Planning (BSP) seemed to address the right issues. With suitable executive involvement and appropriate fanfare, a BSP study was launched. A certain enthusiasm attended the effort and resulted in an impressive report. The executive committee responded favorably to the report and the final presentation.

Two years later, the report remained on the shelf. The business and its information systems department went on exactly as they always had, except that the information systems executive had left for greener pastures.

• Another corporation was in a similar situation. In this case, a number of people attended seminars and read books by a leading guru. Having glimpsed the promised land, top management hired a consulting firm specializing in the guru's methods to lead them through the information and data wilderness.

The results were even more detailed and impressive (and expensive) than in the case above. They were accompanied by enterprise models, logical data models, subject data bases and data affinity analyses. It had been hard work, but deliverance for the information systems function seemed at hand.

Two years later, the materials were on a shelf. The business and its information systems went on exactly as they had, except that the information systems department hired a data administrator and the MIS executive left to become a consultant in the guru's methodologies.

• A third corporation was in a particularly frustrating situation. It had been trying to develop an information system for production planning and control for seven years. After a few million dollars, several project managers, two MIS executives and three prematurely declared successes, the project floundered.

Because the system was so critical to the company, management persisted with the project, preferring to defer consideration of a BSP or other methodologies until the immediate need (if seven years can be defined as immediate) was solved.

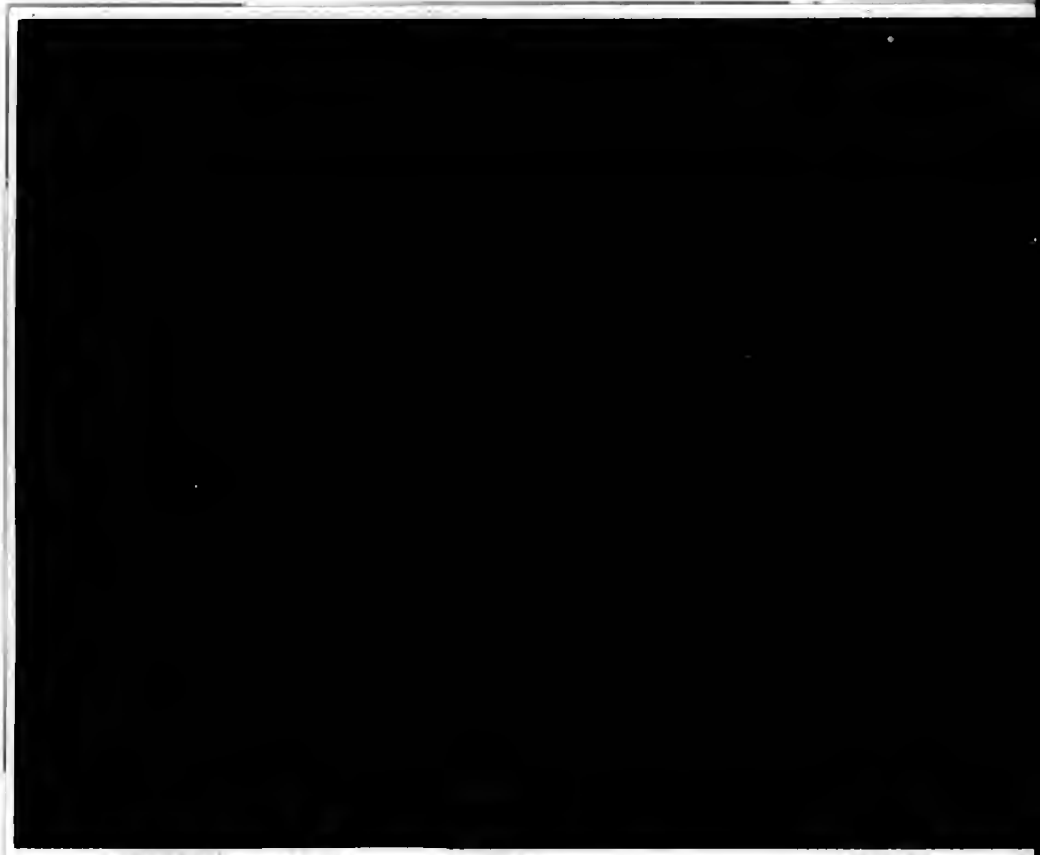
From the viewpoint of the corporate executives, the methods and the project management processes were flawed, although they couldn't have told you how or why. The MIS people were incompetent, having once again failed, even with the involvement and support of the executives. Or, as Hardy was fond of saying to Laurel, "Here's another fine mess you've gotten us into."

But when one applies the principle that the information systems function necessarily reflects the character of the organization it supports, a different picture emerges.

With regard to the first case, two of the principles underlying BSP are that information systems should support corporate objectives and should, in the interest of flexibility, be designed independent of any organizational structure.

The corporation doing a BSP did not do formal strategic planning; this resulted in cultural territorialism, and the information systems department was forced to adhere to the idiosyncracies of

See MIS page 73

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## CALENDAR

### AUGUST 17-23

**Buying and Selling Rights to Software, Hardware and Services.** Boston, Aug. 18 — Contact; Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Aug. 19 in Chicago.

**Thirteenth Annual Conference on Computer Graphics and Interactive Techniques.** Dallas, Aug. 18-22 — Contact: SIGGRAPH '86, Conference Management, Smith, Bucklin & Associates, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

**The Institute on Artificial Intelligence and Expert Systems.** Waltham, Mass., Aug. 18-22 — Contact: Joan Merrick, Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167. Also being held Sept. 29 to Oct. 3 in Chicago.

**Advanced Communications Architectures Seminar.** Washington, D.C., Aug. 19-20 — Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

**DEC: The Next Five Years.** New York, Aug. 19-20 — Contact: The Yankee Group, Seminar Division, 14th Floor, 89 Broad St., Boston, Mass. 02110.

**Second Annual Physical and Electronic Security Symposium and Exposition.** Philadelphia, Aug. 19-21 — Contact: Michael C. Otten, Booz, Allen and Hamilton, Inc., 4330 East-West Highway, Bethesda, Md. 20814.

**Data Communications: Fundamentals and Beyond.** Indianapolis, Aug. 20-22 — Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940.

### AUGUST 24-30

**The Third International Congress on Advances in Non-Impact Printing Technologies.** San Francisco, Aug. 24-28 — Contact: Society of Photographic Scientists and Engineers, 7003 Kilworth Lane, Springfield, Va. 22151.

**Interconnect '86.** San Mateo, Calif., Aug. 26-28 — Contact: Agnes M. Pavel, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

# MIS: Chip off the old block

From page 72

the various organizational units. BSP did not work in this case because the conditions for it to succeed were counter to the corporate culture.

In the second case, the guru's methods required shared, controlled data. This assumed cooperation and controls that cross horizontally over organizational boundaries. But the firm was fragmented and territorial. People found it hard to communicate meaningfully among functions. Managers were certainly not going to let a corporate function, especially information systems, tell them what to do with their data. Again, the underlying assumptions of the methodology required an organizational environment that did not exist.

In the never ending project case, the production planning and control function was constantly battling with multiple product lines competing for control of the shared manufacturing capacity.

This was complicated by a sales function that was opportunistic, undisciplined and determined to do its own thing. The information systems project was at the mercy of organizational practices that did not cooperate toward a common goal.

In each case, the approach to information systems was not wrong. The desired results were not achieved because the intentions were incompatible with the corporate culture. The results reflected the character of the organization, not the method.

Results of a different order would require a basic change in each of the corporations. The only way to improve information systems is to improve the parent organization, because the information systems function necessarily reflects the character of the organization it supports.

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SIECOR

# Ford looks for compatibility

From page 71

man said. "We wanted to improve communications, and we felt office automation would be more effective for Ford if there was a simplified systems environment."

Problems arise in Ford's current approach when there is a department that needs to communicate with a number of groups. "Say there is a group that has partial responsibility for sales and engineering. Should it have a Wang or a Fortune system?," Gilman rhetorically asked.

Although Ford is reasonably happy with the equipment it has installed, the bridges built to link the departments are not fully functional. "Things such as file transfer and revisablity of text either can't be done or are difficult to do," Gilman said.

> ***Constant software updates and maintenance have caused fissures in some of the bridges.***

Constant software updates and maintenance have caused fissures in some of the bridges, Gilman said. "So much of our systems people's time is being taken up by keeping the bridges working. Every time a new release of software comes out, our people have to rework the bridges all over again."

Despite the magnitude of the equipment and services Ford intends to procure over the next five years, Gilman said the decision to negotiate with IBM "was not the world's most important decision."

He said projects crucial to Ford's ability to retain an edge in the highly competitive automotive industry include development of a program to let engineers draft and transmit new product designs worldwide, development of a new generation of computer-aided design systems, enhancements to its telecommunication network and a recently launched effort to bring the management of all manufacturing operations under one system.




# Measuring DP efficiency, quality

From page 71

rate, it's hard to improve it."

In fact, many data processing managers do not even know what they should be measuring, Perry said. "We hear the statement, 'If it's not broken don't fix it.' We perceive that management doesn't even know if it's broken," he said.

The goal of the institute's study, which involved 60 large corporations, was to select the five best measures of data processing quality and productivity. Culled from 120 candidates, the best were the following:

1) Functional quality — a quantitative rating by users.

2) Function points per man-month — a productivity measure, originated by IBM, of functional value per man-month of development work.

3) Customer satisfaction — a user rating emphasizing data center services.

4) Production batch jobs processed without a problem.

5) Project quality — a measure of conformance to requirements.

Perry said user dissatisfaction and cost-cutting are the principal forces behind interest in such measurements.

But there are others. Along with reducing costs, First Data Resources hopes to maintain the quality of its systems while growing at a fairly fast rate, Beal said.

### Air Force measures for software quality

At the Grumman Data Systems division of Grumman Corp. in Bethpage, N.Y., a systems integrator dealing chiefly with military projects, software quality is being measured due to U.S. Air Force guidelines for future projects, said Roscoe Mack, the division's manager of design and product assurance.

Grumman is still researching measurements. First Data Resources is also in initial stages of measurement, classifying quality assurance costs according to whether they crop up during design or development or after delivery.

GTE Data Services, which does most of its development for other units of its parent company, GTE Corp. of Stamford, Conn., has worked with measurements for two years, Coull said.

The division's management has changed about 60% of the procedures it has investigated as a result of measurements, but "whether the changes are for the better, we don't know yet," he said.

### Major difficulties

One of the major difficulties in assessing system quality and development productivity is generating data on old systems for comparison, Mack said. "It takes a couple of years to get quality historical data."

Another difficulty is finding workers with strong statistical skills to do the measuring, he said.

GTE workers have been concerened that measurements could be used to single out unproductive employees, but Coull said the aim is to expose bad processses, not workers.

"If we find an individual problem we just mention that on the side to the person so he can clear it up," he said.

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# On September 24 we're covering DEC and you can be part of it.

## Announcing the Computerworld Extra on Digital Equipment Corporation.

For several decades, no one has posed a serious threat to IBM's stronghold as the number-one computer manufacturer. But, in the last few years, the company from Maynard, MA, has been quietly consolidating and revamping its product lines, its strategies, its entire organization. And they've set their sights on some very big targets.

In the September 24 Computerworld Extra, we'll take a thorough look at what Digital's got to offer. And why many of the world's large and mid-sized companies are now seriously evaluating DEC.

We'll discuss Digital's strengths. Its top-to-bottom architecture. Its networking and distributed processing philosophies. And the products that connect to IBM — including products that may work better in the IBM environment than IBM's own solutions.

And we'll round out the issue by interviewing Ken Olsen, the man behind the $7 billion corporation.

The Digital story is fascinating. Must reading for our 128,000 paid subscribers. Plus all are the people who will read our Computerworld Extra as it's passed on down the hall. Including large numbers of readers at more than 95% of Digital's installed base of large and mid-sized companies. Plus a major share of the IBM installed base.

Extra copies will also be distributed at DEXPO West '86, Oct. 7-10, in San Francisco.

So, if you've got a product or service that's DEC compatible — or an alternative — our Extra gives you a tailor-made audience. But hurry, closing is August 15.

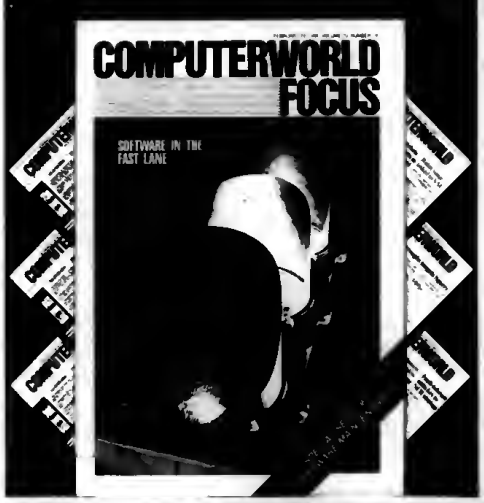
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# NEW PRODUCTS

## Smart LPT tests LAN performance

The Smart LAN Performance Test program (LPT) has been released by Innovative Software, Inc. of Lenexa, Kan.

Smart LPT allows users to compare performances among various local-area network (LAN) systems, as well as among different configurations of the same system. According to a spokesman for the company, the Smart LPT runs real business application software on each workstation and then performs the tests on the last, or Nth, network node. It measures both the throughput of the LAN and the prodoctivity levels that can be anticipated in actual usage.

Outlining typical procedure, the spokesman said the tester selects an application from the menu — such as a data base, word processing or spreadsheet program — and the level of usage — whether light, medium or heavy.

The application selected will run in a loop on each station until the tester chooses to stop. After each workstation is "busied out," the tester selects the control test option, and the Smart LPT performs timed tests, the spokesman stated. The tester can also run the Smart LPT on a single-user personal computer to establish a baseline timing for comparison. During the test, the program generates a test data disk to be used later for reporting.

Once the test has been completed, the tester can print the timed test results for each LAN in spreadsheet form or in a bar chart. The single-user PC test results are included in the graph for comparison. The results of several tests may also be combined into one graph for comparison by time. The comparison can be made either in terms of seconds or by a single-number rating that is calculated by the Smart LPT as a performance factor of the LAN against the single-user PC results, according to the company.

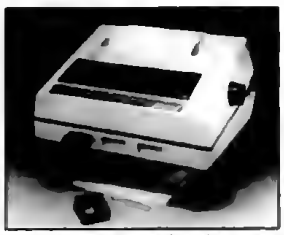
The test program can be used on any LAN operating system compatible with IBM Netbios and DOS Call 3.1 or higher. Smart LPT costs $49.95 and comes with the test program, documentation and Smart Demo Pack.

## Genicom unveils printer duo

### Desktops emulate popular printers' 'personalities'

Genicom Corp. of Waynesboro, Va., has released its 1000 series of serial dot matrix desktop printers, the Model 1020 with an 80-col. narrow carriage and the Model 1025 with a 136-col. wide carriage.

Both the Model 1020 and the Model 1025 have print speeds of 100 char./sec. in letter-quality mode and 200 char./sec. in draft mode. Both printers are said to contain identical performance capabilities and design features, including user-installable personality and font cartridges, versatile paper handling, built-in printer stand and optional color upgrade kit. The Model 1020 is priced at $899, and the Model 1025 is priced at $699.



Genicom's dot matrix printer can take three font cartridges

According to the vendor, hardware and software compatibility is achieved through the personality cartridges, which plug into the back of the computer. Cartridges are available to emulate a number of printers, including the IBM Graphics Printer and Color Printer, the Epson America, Inc. FX series, the Diablo Systems, Inc. Diablo 630 and the Genicom 3000 series.

It is said that up to three plug-in font cartridges can be inserted and on-line simultaneously at the front of the printers.

Type style is user-selected and interchangable on the same document by a software command or by pushing a buttoo on the printer control panel.

A starter kit, containing a Courier font cartridge and choice of one personality cartridge, is available for $99. Additional font cartridges cost $35 each, and personality cartridges are priced at $85 each. Data cables are not included.

The printers offer bi-directional, emphasized, double-strike, expanded, bold, compressed, underscored and proportional printing. A paper-out sensor with audible alarm and alert light, allowing for remote location operation, is one of the user convenience features of the printers.

Each printer, rated at 55 dba, has a standard 2K-byte buffer, with 8K-byte and 64K-byte buffers optional, according to the vendor.

Both printers feature a tilt-back clamshell design. Continuous fanfold paper is fed through the printer from bottom to top. Paper loading for bottom feed is achieved by tilting back the top of the printer.

An optional, dealer-installable color upgrade kit is available for $149.

## PCs, compatibles get AST printer

AST Research, Inc. of Irvine, Calif., has unveiled its Turbolaser printer for IBM Personal Computers, Personal Computers XTs, ATs and compatibles.

The Turbolaser is said to be capable of printing both copies and originals at a rate of 8 page/min. It reportedly provides full 300 dot/in. graphics, running most available PC-based hardware application software programs. The Turbolaser printer is priced at $4,995.

The printer's Laser Printer Controller features 1.5M bytes of random-access memory (RAM). Of this total, 512K bytes are used to store the printer/plotter emolations, the page description package and the printer's resident fonts.

According to the company, a variety of bit-mapped fonts, including fixed-pitch, proportionally spaced type styles, portrait and landscape, are resident on the Turbolaser. The fonts are loaded into the RAM after host power-up and remain in memory, providing instant access. An optional Bitstream, Inc. Bestseller Library of fonts is available on disk for Turbolaser

## PC/Reporter given Dbase III link, interface to file formats

Martin Marietta Data Systems, of Princeton, N.J., has announced PC/Reporter Release 1.1.

PC/Reporter provides reporting capabilities on a personal computer using mainframe and PC data file sources. The program incorporates an open architecture that is said to allow users to create reports from a variety of data formats. PC/Reporter Release 1.1 is available now and is priced at $350.

Release 1.1 of PC/Reporter includes a direct link to Ashton-Tate Dbase III files, a pop-up menu and a user interface for creating reports from a variety of PC and mainframe file formats without having knowledge of programming languages or special protocol, according to a company spokesman.

Other enhancements in Release 1.1 include a larger input window, increased report size capability, greater request editing functionality and enhanced Help facilities.

The PC/Reporter eliminates intermediate conversion steps that most other programs need to work with data formats unlike their own, a spokesman from Martin Marietta stated. It reads and reports directly from the Dbase III data files, according to the vendor.

The product's pop-up menu design masks the conversion process, simplifies request generation and provides the user with all of the choices needed to compile and format both simple and complex reports.

Other data formats are supported, including data files created by Martin Marietta's Ramis II, the mainframe data base management system, and Keepit, its PC data base management system.

According to the vendor, in addition to the pop-up, menu-driven, report-building interface, PC/Reporter provides users with the option of generating requests in syntax similar to mainframe Ramis II.

When used with the company's Ramlink communications software, PC/Reporter can be used to create and test report requests on the PC to run against any mainframe data file accessible through Ramis II.

In this way, PC/Reporter is said to provide Ramis users with a method of prototyping reports using a PC or IBM 3270 Personal Computer terminal.

As a stand-alone program, PC/Reporter executes requests against data stored on the PC or data that has been downloaded from a mainframe. On-line, context-sensitive Help screens are provided at every step, and report output can be directed to a PC's printer, an ASCII file or a PC's monitor screen, where it can be scrolled one line or one page at a time, a spokesman from the company stated.

PC/Reporter runs on IBM Personal Computer, Personal Computer XT, AT and compatible computers and supports both monochrome and color monitors.

**INSIDE**

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## SOFTWARE & SERVICES

### Systems software

**BMC Software, Inc.** has announced **Delta IMS Version 2.0**, said to allow installations to configure IMS/VS on-line.

With Version 2.0, data bases, application programs, transactions and VTAM terminals can be added or modified while IMS is running.

Delta IMS Version 2.0 costs $25,000 and leases for $1,390/mo.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77487.

### Applications packages

**BBN Software Products Corp.** has announced **Release 2** of its **RS/1** scientific and engineering data analysis software.

Release 2 reportedly offers additional graphing functionality and analytical tools as well as greater speed.

Other features include table and graph editing, a money format, and an interface to other programs.

Release 2 of RS/1 was designed for use on Digital Equipment Corp.'s VAX and Microvax computers.

Available in October, Release 2 is priced from $6,000 to $69,000.

BBN Software Products, 10 Fawcett St., Cambridge, Mass. 02238.

■

**Data Management Services** has released the **MLRLIB** mailing system for the IBM System/36 and System/36 Personal Computer.

Features of MLRLIB include a letter writer, labels, post cards, speedy mailers, phone index cards, continuous #7 or #10 envelopes and reports.

The MLRLIB system costs $750 for the initial CPU and $100 each for additional CPUs under the same license.

Data Management Services, P.O. Box 150, Prosser, Wash. 99350.

■

**Mentor Graphics Corp.**, has introduced **Remedi**, an interactive schematic-to-layout debugging module.

Remedi operates with the company's Chipgraph very large-scale integration (VLSI) layout editor and Dracula II layout verification package.

Remedi is said to integrate schematic connectivity information with the physical layout of a custom VLSI circuit and to graphically display the results in windows containing schematic and layout representations. Used in conjunction with Chipgraph, Remedi allows users to detect and correct errors in a physical layout in the same program environment.

Remedi is priced at $14,900.

Mentor Graphics, 8500 S.W. Creekside Place, Beaverton, Ore. 97005.

### Utilities

**Interlink Computer Sciences, Inc.** has added two bidirectional **Electronic Mail Bridges** to its 3711 and 3711S Gateway VM.

The first provides a link between IBM's Professional Office System (Profs) and VM Note Mail Systems and Digital Equipment Corp.'s VAX Mail. The second allows users of IBM's Profs and VM Note to send and receive mail messages to and from users of DEC's All-in-1 office package.

The 3711 Gateway bidirectional Profs/VM Note to VAX Mail Electronic Mail Bridge costs $6,950. The bidirectional Profs/VM Note to All-in-1 Electronic Mail Bridge costs $9,950. For the 3711S Gateway, the prices are $5,950 and $8,950, respectively

Interlink, 39055 Hastings St., Fremont, Calif. 94538.

■

**BMC Software, Inc.** has announced its **3270 Superoptimizer/IMS**.

Superoptimizer/IMS is said to reduce the size of data streams going from IMS/VS to IBM 3270-family screens and printers and back again. It allows additional terminals and printers to be added to a single cluster controller without overloading.

Superoptimizer/IMS costs from $19,000 to $39,000 on the first CPU.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77487.

■

**Data/Ware Development, Inc.** has introduced its **Model DW300 channel monitor.**

The Model DW300 channel monitor is a logic analysis tool for monitoring the IBM and compatible mainframe I/O channels.

The DW300 is said to speed error tracing by providing multilevel triggering either by user-programmed line states or by standard preprogrammed IBM macro sequences.

The Model DW300 costs $9,595, and an RS-232 option card costs $395.

Data/Ware Development, 4204 Sorrento Valley Blvd., San Diego, Calif. 92121.

■

**Aida Corp.** has announced **Automatic Test Pattern Generation**.

Automatic Test Pattern Generation is said to combine high-speed fault simulation as well as a path-tracing algorithm in order to produce high-coverage test vectors for single "stuck-at" faults in scannable designs.

According to the vendor, the Aida Design System reportedly utilizes the Automatic Test Pattern Generation product to automatically generate test vectors for scannable designs.

Automatic Test Pattern Generation costs $45,000.

Aida, Suite 340, 3375 Scott Blvd., Santa Clara, Calif. 95054.

■

**Expertware, Inc.** has introduced **CMT**, a software development aid.

The CMT software system reportedly automates the functions of configuration control, release management, problem reporting and tracking and versions/releases documentation.

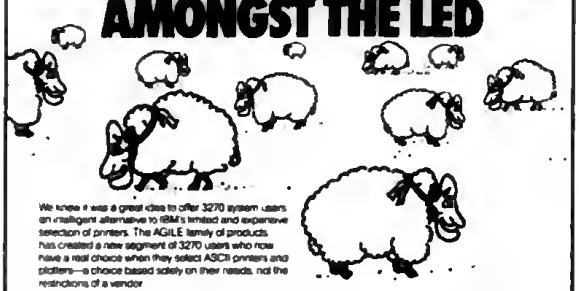
The CMT development system also is said to allow the user to automate the sharing of software and documentation among different configurations.

According to Expertware officials, CMT runs on the IBM Personal Computer AT and mainframes using Unix or Digital Equipment Corp.'s Ultrix operating systems, as well as DEC VAX machines running VMS.

CMT is priced at $35,000 for the multiuser version.

Expertware, Suite 1209, 2685 Marine Way, Mountain View, Calif. 94043.


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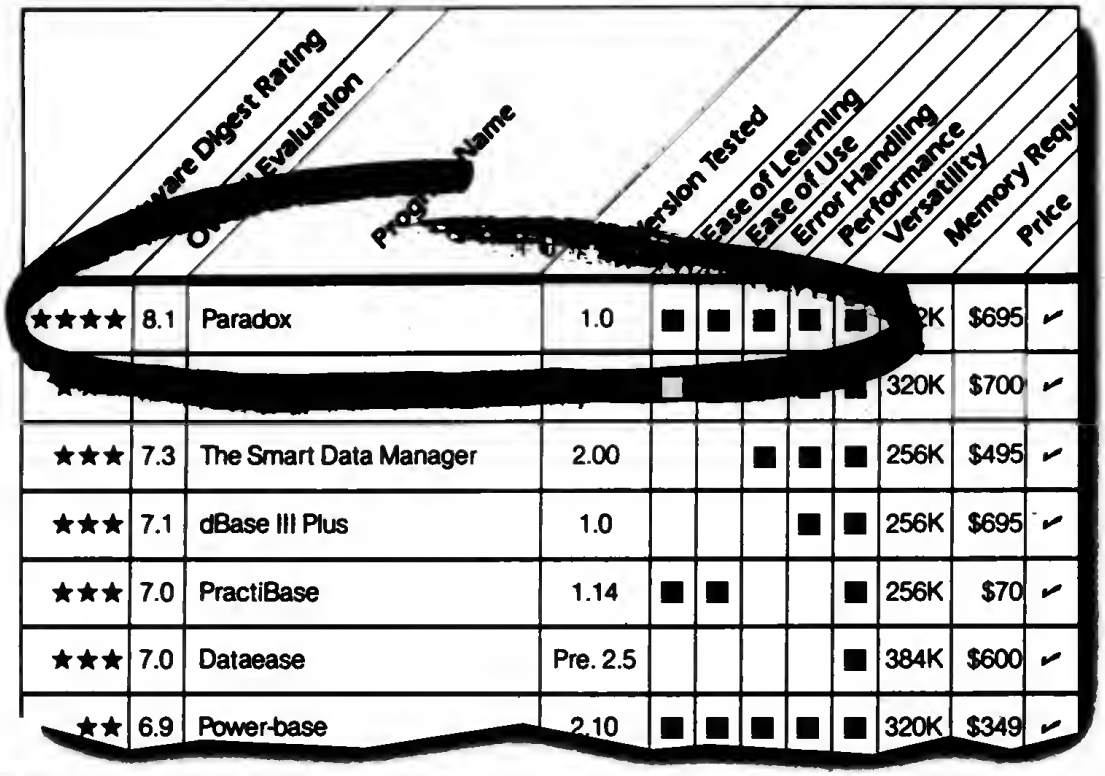
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## NEW PRODUCTS/MICROCOMPUTERS

### MICROCOMPUTERS

#### Systems

**Process & Instrumentation Design, Inc.** has introduced a kit that allows **Prodoc**, an off-line program development and documentation software for Allen-Bradley Co.'s and Gould, Inc. Modicon Division's programmable logic controllers (PLC), to be used on IBM Personal Computers.

The kit is said to expand the PC's capability to provide multitasking. It also provides the ability to view PLC ladder logic with full reference documentation and to edit documentation while viewing the ladder logic.

The kit consists of a coprocessor board with 1M byte of random-access memory, a Prodoc keyboard and Prodoc software, and it costs $9,995.

Process & Instrumentation Design, Suite 110, 1700 Enterprise Way, Marietta, Ga. 30067.

#### Software applications packages

**CEO Software & Leasing** has introduced **Facility Scheduler** software, designed for scheduling meetings at hospitals.

Facility Scheduler allows scheduling for meetings to be done on a 24-hour basis, in one-minute intervals, up to one year in advance. Room availability is displayed by time and date, along with room specifications such as capacity, physical size, location and cost.

Facility Scheduler costs $4,800.

CEO Software, 2153 E. Juanita St., Tucson, Ariz. 85719

■

**Lowell Corp.** has announced **Computer Assisted Marketing Program** (CAMP), which was designed for use on IBM Personal Computers and compatibles.

CAMP is said to provide multilevel sales lead management, media evaluation, letter writing and marketing development. It provides reports for targeting accounts and measuring selling effectiveness.

The package has three modules and includes a library said to have a capacity for more than 100 letters.

CAMP costs $495.95 per module

Lowell, P.O. Box 158, 97 Temple St., Worcester, Mass. 01613.

#### Software utilities

**Burr-Brown Corp.** has introduced **PCI-20046S-2** C language and **PCI-20046S-3** Turbo Pascal language support packages for data acquisition and measurement on the IBM Personal Computer, Personal Computer XT, AT and compatibles.

The PCI-20046S-2 and PCI-20046S-3 packages both interface between programmers and the PCI-2000 system for data acquisition, test, measurement and control products.

The PCI-20046S-2 and the PCI-20046S-3 each cost $225.

Burr-Brown, P.O. Box 1140, International Airport Industrial Park, Tucson, Ariz. 85734.




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## NEW PRODUCTS/MICROCOMPUTERS

**Popular Programs, Inc.** has introduced **Pop-Up Partner**, an outline processor desk tool program for IBM Personal Computers and compatibles.

Pop-Up Partner features pull-down menus and intuitive commands and uses random-access memory-resident technology.

Pop-Up Partner also comes with built-in outlines that work as flexible desktop tools.

Included in the pull-down menus are reference files for IBM's PC-DOS or Microsoft Corp.'s MS-DOS commands, area codes and time zones.

Pop-Up Partner is priced at $99.97.

Popular Programs, Suite 180, 135 Lake St., Kirkland, Wash. 98033.

### Software enhancements

**Texas Instruments, Inc.** has announced that its Microsoft Corp. Xenix V-based, multiuser version **Business-Pro** computer now supports Samna Corp.'s **Samna+** word processing software.

Samna+ combines word processing capabilities with a fully integrated spreadsheet. It provides capabilities such as data interchange format file translation, floating cells and the ability to print to multiple printers.

Samna+ for the Business-Pro costs $1,295.

TI, Data Systems Group, P.O. Box 809063, H-869, Dallas, Texas 75380.

### Communications

**Corporate Microsystems, Inc.** has released **Version 5.0** of its **Mlink** data communications system.

Added features in Version 5.0 include application script development, session capture, Digital Equipment Corp. VT100 terminal emulation on the IBM Personal Computer, the Kermit protocol, the vendor's own sliding frame protocol and enhancements to the Mlink script language.

Mlink was designed for asynchronous data communications for IBM PC-DOS, Micrososft Corp. MS-DOS and Xenix, Unix and Digital Research Inc.'s CP/M-based systems. It is priced from $195 to $2,500.

Corporate Microsystems, P.O. Box 277, Etna, N.H. 03750.

### Data storage

**Tallgrass Technologies Corp.** has added the **TG-1020e** and the **TG-2025e** external units to its line of mass storage subsystems.

The TG-1020e is a 20M-byte tape drive backup system. The TG-2025e is a 25M-byte hard disk with a 20M-byte tape drive backup system. Both utilize the DC-2000 tape cartridge and fit next to a monitor on top of a personal computer.

Both systems include Backtrack, the vendor's automatic hard disk backup system, and Xtree, a menu-driven file and directory management software program.

The TG-1020e costs $1,295. The TG-2025e costs $2,295.

Tallgrass Technologies, 11100 W. 82nd St., Overland Park, Kan. 66214.

### Printers/Plotters/Peripherals

**Epson America, Inc.** has introduced the **EX-800**, a dot matrix printer featuring a color option.

The EX-800 is a 9-pin printer. It prints at 300 char./sec. in draft mode and 54 char./sec. in near-letter-quality mode. The 80-col. printer offers an 8-button type-style selection panel and features IBM printer emulation as well as built-in serial and parallel interfaces.

There is a built-in bidirectional push-feed tractor, an automatic sheet load feature and an optional single-bin cut-sheet feeder.

The EX-800 is priced at $749.

Epson America, Suite 450, 1901 Avenue of the Stars, Los Angeles, Calif. 90067.

■

**Hanzon Data, Inc.** has introduced **LP-3000**, a laser printer with full-page bit-map graphics.

Some features of the LP-3000 include printer status, emulation, page orientation and fonts. The LP-3000 offers fonts including Courier 10, Prestige Elite and the IBM character set. The LP-3000 is said to operate at 8 page/min, and the output is automatically collated in document order.

The LP-3000 features printer emulations for Hewlett-Packard Co.'s Laserjet and Laserjet Plus and Epson America, Inc.'s FX-80.

The 512K-byte version of the LP-3000 costs $3,980; the 2M-byte version costs $4,995.

Hanzon Data, 18732 142nd Ave. N.E., Woodinville, Wash. 98072.

### Board-level devices

**Kamerman Labs, Inc.** has introduced **Slotmachine**, a hard disk drive on a card that fits in a single expansion slot of an IBM Personal Computer, Personal Computer XT or compatible computer.

Designed to support an optional second hard disk drive, the Slotmachine is shock mounted and offers low power consumption, plated media, a built-in disk testing microprocessor, a 5M bit/sec. transfer rate and an access time of 75msec.

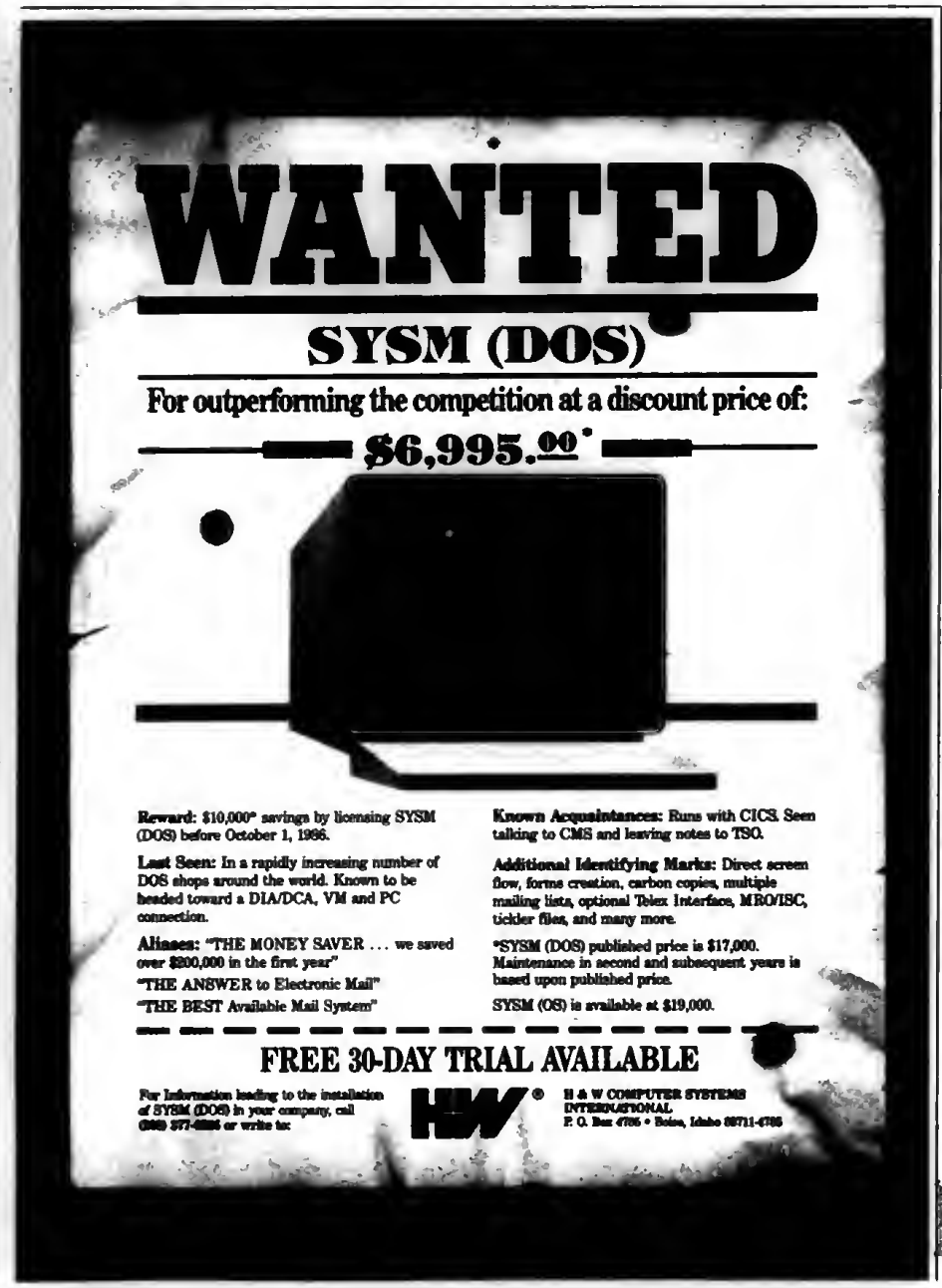
The Slotmachine costs $499.

Kamerman Labs, 7861 S.W. Cirrus Drive, Beaverton, Ore. 97005.

■

**STB Systems, Inc.** has introduced its **Serial/Parallel adapter**, which provides a serial port, a parallel port and a clock/calendar option for IBM Personal Computers, Personal Computer XTs, ATs and compatibles.

According to the vendor, the Serial/Parallel adapter provides the serial port needed for interfacing with asynchronous communication de-

vices. The serial port can be used to connect a personal computer to a modem or to a serial printer.

The Serial/Parallel adapter costs $139.

STB Systems, Suite 125, 601 N. Glenville, Richardson, Texas 75081.

## COMMUNICATIONS

### Controllers

**DY-4 Systems, Inc.** has introduced the **DVME-704** serial communications controller.

The DVME-704 is said to support high-speed data links up to 1M bit/sec., using on-board direct memory access and local buffer space in dual-port memory. All memory devices are dual-ported for message and data passing without double handling.

DVME-704 runs at 10 MHz and offers RS-422 on all channels and optional RS-423 on one channel. It features two four-channel direct memory access controllers, four full-duplex serial I/O channels and asynchronous/synchronous capabilities.

The DVME-704 is priced at $2,565.

DY-4 Systems, Suite 202, 1475 S. Bascom Ave., Campbell, Calif. 95008.

### Voice/data communications

**RAD Data Communications, Inc.** has announced **Miniature Data Over Voice** (MDV), said to allow a user to simultaneously transmit both voice and data over the existing telephone network.

MDV operates asynchronously at speeds up to 9.6K bit/sec. for distances up to one mile in full duplex and connects to all types of telephones without affecting their functions, according to the vendor. MDV is available in two models, one for use with twisted pairs and the other for use with cables with the RJ-11 plug. It operates without AC power.

The MDV is priced at $149.

Rad Data Communications, 40 N. Van Brunt St., Englewood, N.J. 07631.

### Multiplexers/Modems

**Raycom Systems, Inc.** has announced the **5110 series** fiber-optic multiplexer and the **5100-Sync** multiplexer.

Equipped with four I/O modules, the Model 5110 handles up to 144 RS-232 channels, 16 T1 channels, 32 V.35 channels or combinations of these signals. All I/O channels are multiplexed into a 28M bit/sec. aggregate data stream.

The Model 5110 costs from $3,750 to $10,500; the 5100-Sync costs from $3,700 to $6,000.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

■

**Micom Systems, Inc.** has introduced the **Instabus 1080** direct host attachment that provides a multichannel interface between Digital Equipment Corp.'s VAX computers and Micom's data private automatic branch exchange.

Instabus 1080 allows VAX/VMS users to multiplex data from up to 120 asynchronous channels over a T1 line consisting of two twisted pairs.

The Instabus 1080 provides access for up to five VAX systems on a single cable. Instabus 1080 makes it possible to transmit 9.6K bit/sec. on up to 120 channels in the full-duplex mode.

The 120-channel Instabus 1080 costs $5,000.

Micom Systems, P.O. Box 8100, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

### Network services

**Western Union** has announced the availability of its **Memory Mail service** on the company's Easylink electronic communications service.

The Memory Mail service is said to allow users to send messages to up to 100,000 addresses from their computers and terminals. It offers text storage capability and hard-copy options.

Memory Mail is available for a one-time setup fee of $50. For each connect session, the first minute is free, and subsequent charges are 35 cents per minute.

Western Union, One Lake St., Upper Saddle River, N.J. 07458.

### Test equipment

**Systems Strategies, Inc.** has introduced **TestSNA/3270** systems network architecture (SNA) and **TestBSC/3270** binary synchronous communications (BSC), products for testing the communications function of IBM's 3270 series computer products and systems.

TestSNA has 190 programmable test scenarios for SNA 3270 testing. TestBSC/3270 has 79 scenarios that test control unit data link control.

TestSNA/3270 costs $10,000, and TestBSC/3270 costs $8,000.

Systems Strategies, 225 W 34th St., New York, N.Y. 10001.

**Electronic Industries Association** has announced **EIA-455-95 fiber-optic test procedure** for fibers and cables.

The EIA-455-95 test procedure describes a method for determining the total optical power emanating from an optical fiber.

According to the vendor, the procedure can be used for, but is not limited to, measuring such things as the attenuation of the fiber or cable. The EIA fiber-optic test procedure can also be used for measuring loss of terminating devices or methods, the amount of optical power coupled into the fiber by a source or the optical power at the system receiver.

The EIA-455-95 fiber-optic test procedure costs $5 per copy.

Electronic Industries Association, 2001 Eye St. N.W., Washington, D.C. 20006.

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*Take it to the limit.*

**NEC**

## NEW PRODUCTS/COMMUNICATIONS

### Auxiliary equipment

**Cylix Corp.** has announced its **MTJ** line of modular telephone jack protectors.

The MTJ line provides protection from transient overvoltages caused by lightning and other sources for modems, intelligent telephones, facsimile machines and other equipment utilizing RJ-11 and RJ-45.

Protection for dial-up lines is standard but can also be supplied for additional applications, including dedicated lines, RS-232 and others. The MTJ has two- and four-wire protectors.

The MTJ costs from $59 to $79.

Cylix, 550 Smithtown Bypass, Smithtown, N.Y. 11787.

■

**Comverse Technology, Inc.** has released its **Trilogue** advanced message management system.

Trilogue enables a standard Touch-Tone telephone to access a range of applications such as voice mail; automated attendant, which provides direct extension dialing from both outside and inside voice mail; call screening; audiotex; as well as text-mail integration, according to the vendor.

Trilogue is priced from $35,000 to $185,000.

Comverse Technology, 400 Crossway Park Drive, Woodbury, N.Y. 11797.

## SYSTEMS & PERIPHERALS

### Graphics systems

**Tektronix, Inc.** has announced the **4132 workstation**, an upgrade of its 6130 Intelligent Graphics Workstation.

The 4132 incorporates the Unix-based Tektronix Utek operating system and Ethernet local-area network. It offers up to 24M bytes of hard-disk storage and has two direct memory access serial ports.

The 4132 also provides a small-computer systems interface port and includes an IBM Personal Computer AT-compatible 1.2M-byte disk drive.

The 4132 costs $12,950.

Tektronix, P.O. Box 1000, Wilsonville, Ore. 97070.

### Data storage

**EMC Corp.** has announced their **Dia-MVXII** off-line memory diagnostic package for use in Digital Equipment Corp.'s Microvax II systems.

Dia-MVXII is said to provide complete diagnostics of all memory arrays down to the chip level. It also offers the user the ability to test individual Microvax II memory arrays and to isolate trouble spots or necessary repairs.

The Dia-MVXII is priced at $750. Dia-MVXII is free of charge to existing EMC VAX customers.

EMC, 12 Mercer Road, Natick, Mass. 01760.

■

**Honeywell, Inc.** has added an **Event Precursor recorder** function to its line of VP 131 Versaprint reporters.

The Event Precursor recorder is said to permanently acquire and store data in solid-state memory. When an event-triggering condition occurs, the recorder downloads onto the chart the last process data with the accompanying messages, time lines, range markings and channel markings. The recorder, a removable chart cassette, carries all mechanical and electrical assemblies for printing.

The Event Precursor recorder is priced from $2,900.

Honeywell, 1100 Virginia Drive, Fort Washington, Pa. 19034.

### Printers/Plotters

**BDT Products, Inc.** has announced its three-bin **Laserfeeder.**

The Laserfeeder provides four paper bins and has the ability to automatically feed envelopes. Users who desire an automatic collator can purchase an optional automatic collator from BDT.

The Laserfeeder is compatible with Hewlett-Packard Co.'s Laserjet and Laserjet Plus and Canon U.S.A., Inc.'s LBP-8 series.

The Laserfeeder costs $4,690. The automatic collator costs $200.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

■

**Sperry Corp.** has introduced the **Sperry 0770-II** printer for its 1100 series computer systems.

Continued on page 90




*The Silent 700™ Data Terminal Series from Texas Instruments.*

# It pays to get good connections.

**TI's line of portable data terminals leads the market in keeping people connected to their operations no matter where they are, or where they're going.**

For 15 years, whether you've needed to keep in touch with satellite offices, supply your field sales force with communications tools, access a remote data base or eliminate telephone tag, TI has always had the right data terminals for the job. They're easy to operate. Rugged. Self-contained. Lightweight. Affordable. And quiet.

**The TravelMate™ Portable Terminal.**

The latest addition to the Silent 700 Series brings the convenience of both a desktop display and printer to a portable terminal. The TravelMate comes with built-in editing capability, and an easy-to-read, pop-up LCD display so you can see what's happening before you transmit, or as you receive. Its printer control key allows you to print selectively on its quiet printer. Of course, all the communications capabilities are built-in, and you can choose a 300 or 300/1200 baud internal modem. There's even a model designed for direct connection to your computer.



**Programmed to do your business.**

Personalized Application Cartridges are what make TI terminals customizable. They can be programmed with features and functions that satisfy your specific communications, data entry and retrieval needs. Application-specific cartridges can be developed for remote sales automation, data base inquiry, or electronic mail, to name a few.

So no matter what your application, if your people need to stay in touch, TI has the right connection. For more information on TI's family of Silent 700 Series Portable Data Terminals, call toll-free **1-800-527-3500.**

TEXAS INSTRUMENTS

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Continued from page 88

Key features include 2,000 line/min. printing, reduction in footprint size to 10.8 sq ft, an internal vacuum system, front and rear operator panels and the capability to use a variety of print bands.

Available in fourth-quarter 1986, the 0770-II printer costs $60,000.

Sperry, World Headquarters, Blue Bell, Pa. 19424.

■

**Printware, Inc.** has introduced the **720IQ laser imager** printer and the **1200HD** and **600HD image processors** that serve as controllers for the 720IQ.

The 720IQ laser imager delivers 1,200 by 600 dot/in. output at 8 page/min. According to the vendor, the 720IQ's resolution is capable of reproductions of typographic fonts, imaging graphics and halftones. The 720IQ also allows users to print in red, blue or brown.

The 1200HD image processor supports 1,200 by 1,200 dot/in. resolution while executing a full set of typographic and graphic functions. The 600HD supports 600 by 600 dot/in. resolution.

The 720IQ laser imager costs $9,990; the 1200HD image processor costs $2,990; and the 600HD costs $790.

Printware, #103, 1408 Northland Drive, St. Paul, Minn. 55120.

## Auxiliary equipment

**Ohm Electronics, Inc.** has added **Models AB25, AB36, ABC25** and **ABC36** to its family of Scooter data switches.

The switches permit the user to put any of two or three compatible peripherals on-line by pushing a button. They do not require any power and are available with either two or three switch connections.

Model AB25, serial, and Model AB36, parallel, offer two push-button switches and two rear-mounted peripheral connections. Model ABC25, serial, and Model ABC36, parallel, offer switching and connection features.

Model AB25 costs $79; Model AB36 costs $85; Model ABC25 costs $84 and Model ABC36 costs $96.

Ohm Electronics, 746 Vermont St., Palatine, Ill. 60067.

■

**Genicom Corp.** has introduced the **Genicom bar code package** for use on the company's 4000 series of shuttle matrix line printers.

The Genicom bar code package includes 17 popular domestic and European bar codes, variable height and width, human-readable codes printed or not printed, characters expandable up to eight times their original height and width, a set of line drawing characters, a variety of character styles and pitches and letter-quality characters.

The Genicom bar code package is priced at $395.

Genicom, Waynesboro, Va. 22980.

## PRICE REDUCTIONS

**Televideo Systems, Inc.** has reduced the price of its **Tele-286** IBM Personal Computer AT-compatible computers and its **Personal Mini file server products.**

The Tele-286 Model 1 AT-compatible computer has been reduced from $3,395 to $2,695, and the Tele-286 Model II has been reduced from $5,795 to $4,995.

The Personal Mini family of file server products included in the reductions are as follows: The PM 16T file server has been reduced to $8,995, the PM 16T/85 has been reduced to $10,995, and the PM Workstation has been reduced to $1,095.

Televideo Systems, P.O. Box 3568, 1170 Morse Ave., Sunnyvale, Calif. 94088.

■

**Microdirect, Inc.** has reduced the price of its **SST 286 PC-AT**.

The SST 286 PC-AT includes a 1.2M-byte floppy disk drive, IBM DOS 3.1 operating system, monochrome monitor, monochrome adapter and 512K memory, according to the vendor.

The SST 286 PC-AT has been reduced from $4,995 to $2,770. The reduced price also includes first year on-site maintenance, according to the vendor.

Microdirect, 180 Bent St., Cambridge, Mass. 02141.

■

**Borland International, Inc.** has bundled its **Turbo Pascal language development system** for IBM Personal Computers and compatibles with **binary coded decimals** and **support for the 8087 math coprocessor**, reducing the cost of the complete package.

The bundling with binary coded decimals allows development of business applications, such as spreadsheets, where a high degree of numeric accuracy is important, according to the vendor.

The Turbo Pascal with the binary coded decimals and support for the 8087 is priced at $99.95, the vendor said.

Borland International, 4585 Scotts Valley Drive, Scotts Valley, Calif. 95066.

■

**Goldata Computer Services, Inc.** has reduced the price of its data base management package **Goldatabase Version 6.0**.

Goldatabase has been reduced from $595 to $124.95, according to the company.

Goldata Computer Services, Two Bryn Mawr Ave., Bryn Mawr, Pa. 19010.


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# COMPUTER INDUSTRY

*Section begins on page 118*

# Once leader of low-end mart, NCR's ADDS reverses course

## Targets value-added terminals at end users

**By Alan Alper**

HAUPPAUGE, N.Y. — In 1981, NCR Corp.'s Applied Digital Data Systems (ADDS) subsidiary was considered the price/performance leader in the ASCII terminal marketplace. The company had just introduced a no-frills terminal that listed for $650 and appeared poised to overtake market leader Lear Siegler, Inc., whose Data Products Division had been the first to crack the $1,000 price barrier.

Five years later, ADDS is in the final throes of a complete strategic reversal. It no longer covets the low end of the terminals business, now characterized by steep price erosion (33% during the last three years), slim unit-shipment growth (only 7.2% last year) and little or no product differentiation.

"We're not interested in fighting it out in the trenches with low-priced, low-featured machines," asserts David Laws, who joined ADDS as president in 1983 after 31 years with NCR, which purchased the company for $60.9 million in 1980.

"That's not to say we won't have a basic-style terminal in the line, but our major thrust will be on value-added products, products that tend to be higher priced and more attuned to distributor and end-user needs."

ADDS first lost its pace-setting position to Televideo Systems, Inc. in 1982, which was summarily overtaken by Wyse Technology, Inc. two years later [CW, July 7]. Both competitors borrowed concepts from the evolving microcomputer and, unlike ADDS, made propitious use of offshore manufacturing to keep costs down. Moreover, shrinking profit margins began cutting into research and development expenditures, making it difficult for ADDS to keep its product line current.



ADDS' President Laws

"People were wondering what happened to them," recalls Diane Farrell, a research analyst at International Data Corp. in Framingham, Mass. "They introduced relatively few new products over the last few years, with the exception of a Digital Equipment Corp. VT220 emulator."

ADDS, with an installed base of 750,000 units, also diversified into the IBM Personal Computer-compatible market by remarketing microcomputers made by NCR and Multitech Systems, Inc. of Taiwan. ADDS did so, observers say, while losing momentum in its mainstay ASCII market segment.

Still ranked as the No. 2 independent ASCII terminal manufacturer, ADDS was responsible for about 10% of the 850,000 units shipped last year, according to market research firm Dataquest, Inc. in San Jose, Calif. But in 1984, ADDS shipped about 100,000 terminals, accounting for almost 13% of the market, Dataquest estimates.

"They've lost share, as has everyone else, to Wyse," notes Dataquest's Robert Sanekoff.

ADDS is pinning its turnaround hopes on a new generation of feature-rich products. Leading off the new generation is the recently introduced Model 2020, said to provide crisper characters and flicker-free viewing. It also emulates the Wyse 50, a variety of top-selling Televideo terminals and ADDS's own models, making it usable in "90% to 95% of the marketplace without alteration," Laws says.

Priced at $695, $100 more than the popular Wyse 50, critics say the 2020 may be too expensive for its own good. Laws contends that the meticulous attention paid to stability of display and feel of the keyboard make the 2020 worth the premium.

Laws says ADDS' Display Terminal Division has been able to remain "very" profitable. The division reduced its 430-member work force by 250 during the last year, and its move to total offshore production has saved roughly 25% on product costs, Laws claims. Laws strongly denies rumors that NCR is considering folding ADDS into its corporate infrastructure to achieve further cost savings. Noting that ADDS makes more use of NCR staff departments than ever before, Laws says the marketing advantage of ADDS' name and reputation would be muted by a melding.

But one former executive points out that the percentage of revenue that ADDS derives from its parent is increasing

While NCR at one time accounted for 10% to 15% of ADDS revenue, that has increased to more than 20%, he says, owing, in part, to declining orders by outside customers.

"Since they are a product-driven company, unless they can spur the customer side of their business, they are in danger of being folded into the parent company," the former insider says. "They could become just another plant for NCR."


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# Ford falls prey to fist of FUD

From page 118

given in the first week of June, Ford found a minimal difference between the archrivals, according to S. I. Gilman, Ford's executive director of information systems.

The three vendors were evaluated by three committees. One committee of gurus measured the technical aspects of the proposals; one group of purchasing and financial types looked at business terms and conditions; and an executive steering committee of high-level DP and user management assessed which company would be best to deal with.

Interestingly, all three firms graded evenly on technical issues as well as on business terms and conditions, Gilman says. Only the third committee gave IBM the edge.

"After a short but intensive review, we went with IBM by using a Ouija board," Gilman quips.

In a more serious vein, he adds, "The decision was based on intangibles: the comfort level of the executives we dealt with, long-term viability and willingness and capability of support and service."

The recommendation to negotiate with IBM was taken through the Ford hierarchy to its management committee, which, according to Gilman, "challenged it, questioned it and eventually accepted it."

FUD strikes again.

Yet, if you were to have looked at Ford's major technical requirement — the need for departmental processors to exchange data with one another via personal workstations — it might have appeared that DEC had a leg up. DEC's VAX architecture runs the same software from top to bottom. IBM, with its multiplicity of mid-range architectures, seems to offer a confused approach.

"DEC's All-In-1 office automation software is not that great, but it's still better than the Professional Office System or Disoss, IBM's office automation software," adds George Colony, president of Cambridge, Mass.-based Forrester Research, Inc.

DEC also seemed to have leverage in the "intangibles" area: Its founder, Kenneth Olsen, sits on Ford's board of directors. Ford's former chairman, Philip Caldwell, has been a DEC director since 1980. But these were no match for FUD.

Plainly, Ford took the safe approach by choosing IBM. In the event of a problem, no one within the firm's management could question the choice. Selecting DEC or Wang would have allowed for too much second-guessing the minute something went wrong.

Big Blue, apparently, still has pull. Should someone check Ford's Ouija board?

# Ashton-Tate gets business graphics

From page 118

many years, Ashton-Tate has reinforced its policy of buying firms with strong product lines. In the past two years, Ashton-Tate has acquired word processing leader Multimate International Corp. and Framework developer Forefront Corp.

Ashton-Tate will pay approximately $13 million for Decision Resources, whose products include Chart-Master and Signmaster for the IBM Personal Computer.

Founded in 1981, Decision Resources' sales grew from $9.6 million to $13 million in the fiscal year ended June 30. "We were at the point where we could not generate enough capital to fund our projected growth," President and cofounder Sean O'Connor said. "I knew the company was likely to grow faster with Ashton-Tate than if we went public."

The acquisition is likely to mean the addition of enhanced graphics capabilities for Ashton-Tate's Dbase data base management system and Multimate word processing packages.

# Europe criticizes U.S.-Japan pact

From page 118

pressure on prices elsewhere," said Jean Caillot, president of the anti-dumping working group of the European Electronics Components Manufacturers Association.

"Europe is going to hurt," agreed Murray V. Duffin, corporate vice-president and director of strategic planning at SGS-Ates, Italy's state-owned semiconductor maker.

In a statement, European Community trade commissioner Willy de Clerq and industry commissioner Karl Heinz Narjes said the Commission of the European Community accepted the parts of the settlement "[that] are intended to eliminate dumping in the U.S. market."

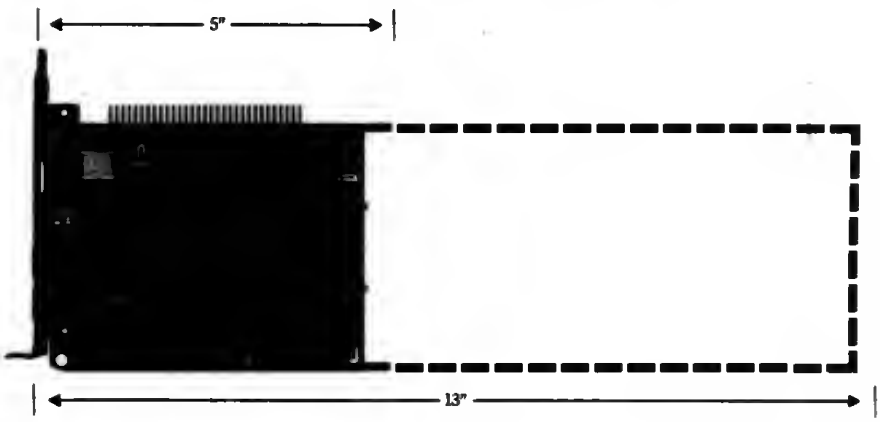
The two officials also emphasized their concern that U.S. firms' semiconductor products may gain favored access to the Japanese market, which would be to the detriment of European products.

The U.S.-Japan accord stipulates that Japan will help redress the semiconductor trade imbalance between the two countries, although the pact does not specify figures.

But a commission official, who declined to be named, suggested that access to the Japanese market is not a major issue in Europe, because, "European manufacturers are so far behind anyway, the Japanese don't want our products."

*From the Computerworld International News Service, European bureau.*

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# Two Comdisco salesmen barred from using 'proprietary' data

## Sungard charges former employees

By Alan Alper

PHILADELPHIA — Two salesmen for the Comdisco Disaster Recovery Services subsidiary of Comdisco, Inc. have been barred from using proprietary information allegedly taken from their former employer, Sungard Recovery Services of Wayne, Pa.

A Philadelphia Court of Common Pleas judge has issued a permanent injunction against Comdisco and the two salesmen.

According to a complaint filed by Sungard July 11, former Sungard salesmen Ronald VanderKamp and T. Scott Rumer allegedly took documents that contained price lists, business cards and current customer lists after resigning June 30 to work for Sungard's competitor, Comdisco Disaster Recovery Services.

The permanent injunction, issued July 17, orders the two salesmen to provide Sungard with a list and status report on all companies they contacted between Jan. 1 and June 30.

**Contact restrictions**

The two men are also prohibited for a period of six months from contacting current Sungard customers, their affiliates and certain prospects of Sungard Recovery Services in the Northeast.

A Comdisco Disaster Recovery Services spokesman said the firm agreed to the injunction to avoid a prolonged and costly lawsuit. "We felt we could have won, since all the information they claimed was stolen was public knowledge, but we settled for the sake of expediency," the spokesman said.

Sungard said it filed suit against Rosemont, Ill.-based Comdisco because the two men had taken information generated while they were employed by Sungard.

"Also, VanderKamp was our top salesman in the area," a Sungard spokesman noted.

## 5¢ NICKELS AND DIMES

**MAI/Basic Four, Inc.** reported revenue for the third quarter ended June 30 of $69.5 million, compared with $59.3 million a year ago. Profits were $4 million, or 25 cents per share, compared with $2.8 million, or 21 cents per share, in the comparable period a year ago.

■

**Ask Computer Systems, Inc.** announced revenue for the year ended June 30 of $76 million, compared with $79.2 million in the previous year. Profits were $5.9 million, or 46 cents per share, compared with $7.9 million, or 65 cents per share, in the like period last year.

For the fourth quarter, revenue was $26.6 million, compared with $20.8 million for the like period last year. Profits were $2 million, or 15 cents per share, compared with $2.3 million, or $18 cents per share, in the prior year.

■

**Masstor Systems Corp.** reported net income of $252,000, or 2 cents per share, on revenue of $9.3 million in the second quarter ended June 30. This compares with a net loss of $3.4 million, or 21 cents per share, on revenue of $8.1 million reported in the like period last year.

■

**Zenith Electronics Corp.** reported a loss for the second quarter of $9.9 million, or 43 cents per share, compared with a loss of $4.5 million, or 20 cents per share, in the like period a year ago. Revenue was $381 million, compared with $357 million for the second quarter a year ago.

■

**Mentor Graphics Corp.** announced revenue for the second quarter ended June

See NICKELS page 97



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AST-5250/ Async Dialup featuring multiple sessions

**NICKELS** from page 96

30 of $42.1 million, compared with $33.5 million in the like period a year ago. Profits were $2.3 million, or 14 cents per share, compared with $1.8 million, or 12 cents per share, in the previous year's second quarter.

■

**Interleaf, Inc.** announced revenue for the first quarter ended June 30 of $6.4 million, compared with $2.8 million for the first quarter last year. Net loss was $1.2 million, or 13 cents per share, compared with $1.4 million, or 16 cents per share, for the like quarter a year ago.

■

**Gould, Inc.** reported revenue for the second quarter ended June 30 of $321.3 million, compared with $355.9 million in the previous year. Net income was $4.3 million, or 10 cents per share, compared with a net loss of $144.7 million, or $3.30 per share, in the like quarter last year.

**Daisy Systems Corp.** announced a net loss of $1.8 million, or 10 cents per share, on revenue of $23.1 million for the third quarter, which ended June 30. For the like quarter a year ago, the company reported net income of $5.5 million, or 31 cents per share, on revenue of $32.5 million.

■

**Information Resources, Inc.** announced revenue for the second quarter ended June 30 of $21.8 million, compared with $18.3 million in the previous year. Profits were $2.5 million, or 15 cents per share, compared with $2.1 million, or 13 cents per share, in the like period a year ago.

■

**VLSI Technology, Inc.** announced revenue for the second quarter of $26 million, compared with $19.6 million one year ago. Profits were $159,000, or 1 cent per share, compared with $115,000, also 1 cent per share, in the previous year.

■

**Silicon Systems, Inc.** reported revenue for the third quarter ended June 28 of $19.7 million, up 77% from the $11.1 million reported in the like quarter a year ago. Profits for the quarter were $556,000, or 8 cents per share, compared with $261,000, or 4 cents per share, in the prior year.

■

**Scientific Micro Systems, Inc.** announced revenue for the second quarter ended June 30 of $15.9 million, compared with $8.5 million a year ago. Net income for the quarter was $617,000, or 8 cents per share, compared with a net loss of $740,000, or 10 cents per share, in the comparable period one year ago.

■

**Xyvision, Inc.** announced net income for the first quarter ended June 28 of $834,000, or 22 cents per share, compared with a loss of $814,000, or 22 cents per share, for the first quarter of last year. Revenue was $5.1 million, compared with $1.9 million for the same period a year ago.

■

**Avant-Garde Computing, Inc.** reported a loss of $5.2 million, or $1.40 per share, on revenue of $16.3 million for the year ended April 30. This compares with net income of $875,000, or 24 cents per share, on revenue of $20.4 million for fiscal 1985.

The company reported fourth-quarter revenue of $4 million, compared with $3.7 million in the like quarter a year ago. Net loss was $2.3 million, or 62 cents per share, compared with a loss of $392,000, or 11 cents per share, for the same quarter a year ago.

■

**Xidex Corp.** announced revenue for the year ended June 30 of $432.3 million, a 67% increase over the $259.5 million reported for the previous year. Profits for the year were $32.2 million, or 75 cents per share, compared with $24.5 million, or 81 cents per share, in the previous year.

For the fourth quarter, the company reported revenue of $141.2 million, compared with $88.4 million a year ago. Profits for the quarter were $11.1 million, or 25 cents per share, compared with $7.9 million, or 19 cents per share, in the like period a year ago.

■

**Valid Logic Systems, Inc.** reported revenue for the second quarter ended June 30 of $15.1 million, compared with $14.6 million in the prior year. Profits for the quarter were $220,000, or 2 cents per share, compared with $626,000, or 5 cents per share, in the like period a year ago.



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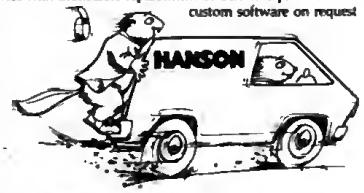
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The deliverables will include further definition of Business Systems Design; the Computer System Design; Coding, Testing and Implementation.

Proposals will be publicly opened and read at the office of the New York City Housing Authority at 2:00 P.M. in Room 2403-A on the 24th Floor, on Monday, September 8, 1986.

The selection will be made on or about September 24, 1986, after all properly submitted proposals have been evaluated, rated, and adjusted in accordance with the terms of the request.

Requests for Proposal (R.F.P.) can be obtained daily at New York City Authority offices, 250 Broadway, in Room #711 on the 7th Floor during the business hours at 9:00 A.M. to 4:30 P.M., weekdays from Mr. Wm. Steinmann or from Mr. Nicholas Celeca.

A bidders meeting will be held in the New York City Housing Authority offices at 250 Broadway, New York, N.Y. 10007 in Room 2403-A on the 24th Floor on August 27, 1986 at 2:00 P.M.

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This is an opportunity for contractors experienced in the delivery of IBM and/or VAX courseware to deliver training for a major training services company. Requirements include experience in the development and delivery of IBM and/or VAX courseware and a track record of achievement. Send a resume and a list of courses you are prepared to deliver to:

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| IDMS | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| ADS/O | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| DATACOM/DB | ● | ● | | | | | | ● | | | | | ● | |
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| ADABAS/NATURAL | ● | ● | ● | | ● | ● | | | ● | ● | | | ● | |
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| FOCUS | | ● | ● | | ● | ● | | ● | | ● | | | | |
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| APL | | | | | | | | | | | | | | ● |
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Qualified applicants should forward their resume indicating salary history, in confidence to:

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**GESCO CORPORATION**
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**RESEARCH PROGRAMMER**

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**Department of Computer Science**
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The position is academic/professional. The salary is open and will be competitive and appropriate to the qualifications and experience presented. The position is available immediately. It is desired that the position be filled by November 1, 1986, or earlier. In order to assure full consideration, applications should be received by September 30, 1986. Interviewing will take place during the application period but no final decision will be made until after deadline for applications. Interested persons should send a complete resume and three letters of reference to William J. Kubitz, Associate Head, Department of Computer Science, University of Illinois at Urbana-Champaign, 1304 West Springfield Avenue, Urbana, Illinois 61801, phone: (217) 333-6340

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## Engineering School — Dartmouth College

Master's degree in Engineering, Computer Science or very related field with 3 years of experience in networking, software engineering and/or graphics, or the equivalent. Demonstrated understanding of engineering curriculum and computer applications to that curriculum. Very good interpersonal and supervisory skills. Commitment to continually keeping abreast of new technology and to representing the College at outside professional meetings. Manages all operational aspects of Project Northstar, a school-wide project in integration of workstation technology into an interdisciplinary, non-departmentalized Engineering curriculum. The project requires integration of hardware, software, and specialized networking within the Dartmouth College campus-wide network with applications in five major areas, i.e. Scientific Computer, Data Acquisition, Computer Aided Design, Decision Analysis, and Computer Engineering. Review of resumes to begin August 15, 1986.

**Send resumes to:**

**Search Committee**
**Project Manager**
**Thayer School of Engineering**
**DARTMOUTH COLLEGE**
**Hanover, NH 03755**

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Interested and qualified applicants please send resume and salary history in confidence to:

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Progressive mfr. seeks tech astute analyst for integrated mfg./fin'l. appls. Previous inventory control, distribution & acctg. experience req. Experience w/VAX, BASIC, COBOL & DATATRIEVE is a plus. Salary to $33,000.

**HARTFORD**
**SYSTEMS/ANALYSTS PROGRAMMERS**
New devel. project by CT corp. req's. 12 S/A's, P/A's with 3+ years' COBOL & IDMS or CICS on-line design exp. Excellent Blue Chip client offers full relocation to results-oriented indiv's. Salaries $26-$34,000

**HARTFORD**
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**SR. PROGRAMMER**
Sophisticated fin'l. svcs. firm seeks technically astute Sr. Programmer for new appls. devel. Req. 3+ yrs.' IBM COBOL IMS exp. Oppty. to work on newest app. plgs. & increase your tech. skills. Full reloc. $40,000.

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# SYSTEMS PROGRAMMERS/ COMMUNICATIONS SYSTEMS ANALYST

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Qualified candidates will be joining the largest savings and loan association headquartered in New York State. We are offering an opportunity to work with professional colleagues in the hardware/software data communications planning for the association.

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Send resume to:

IG Systems
1301 Shoreway Rd.
Suite 200
Belmont, CA 94002

**Programmer/Analyst**
**Database Support**

The Academic Computer Center at Western Michigan University seeks a Programmer/Analyst-Database Support-to plan, prepare and present workshops, provide consulting services, develop programs and applications, coordinate activities in the area of database organization, design, and support. Formal education in Computer Science or related field with experience in database in required. knowledge of SQL, Access R, DEC VAX CDD, Datatrieve, etc. along with experience in an academic setting are required. Strong oral and written communication skills are essential. Qualified candidates should send their resumes to Ms. Wanda Blackmon, Manager Of Employment Services, Personnel Department, Student Administration Building, Western Michigan University, Kalamazoo, Michigan 49008. Reference posting # 86-87-019. Closing date August 22nd 1986. WMU is an EEO/AA Employer

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215-265-6977

1725 Jeff Davis Hwy #406
Arlington, VA 22202
703-892-0212

**DIRECTOR, INFORMATION AND TELECOMMUNICATION SYSTEMS**

Oakland Community College seeks qualified candidates for the position of Director, Information and Telecommunication Systems, who shall act as advisor and consultant of the Chancellor. The position is responsible for planning, organizing and evaluating all computer and telecommunication systems operations of the College. Special attention will be given to integration of operations with UNIX and persons to assure the success of the whole system. Administrative and academic support services are to be provided. Emphasis on the evaluation of services, software and hardware is expected. Leadership for staff in the computer center is an essential prerequisite for these activities. Qualifications: the college is looking for an innovative leader for all aspects of its operations in the information systems. An appropriate advanced degree is preferred. Extensive experience of at least 10 years in academic or business settings is expected. Demonstrated experience as a Manager of an Information and Telecommunication System. Oakland Community College is a public institution located in suburban Detroit, Michigan serving 26,000 students in almost 100 programs most of which lead to associate degrees. Salary for this position is competitive for the area, experience and responsibilities audited. Working conditions and benefits are exceptional. Resumes should be sent by August 29, 1986 to:

Personnel Department
Oakland Community College
Director, Information and Telecommunication System Application
2480 Opdyke Road
P.O. Box 813
Bloomfield Hills, MI 48013

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RESEARCH STAFF MEMBER: Research Expert System Shells or Environments: Extend current versions of OPS5 lang. using LISP/VM. Investigate & dev. advances in improved pattern matching, k/representation & acquisition, inferencing, controlling problem solving, integrate concepts into unified lang & environment, with structure, of validate concepts. In-depth k/exp in AI, expert systems, langs, compilers, user interfaces req'd. Demonstrated ability to carry out leading edge research in these areas be reflected in publications & reports. Ability to use VM/CMS operating system, in-depth k/& fluency in LISP lang & OPS5 prod system lang; exp writing + debugging large LISP programs involving pattern matching algorithms req'd. Ability to effectively communicate, write-up & present results of theoretical wk for conf & simd pub. PhD Comp Sci or Elec Engr + 1 yr in job or 1 yr teaching comp sci & elec eng req'd. 40 hrs/wk, 8:30am-5:12pm, $50,000/yr. EOE. Resume to: NYS Job Svc, 45 Church St, White Plains, NY 10601. Include JO #0705100, DOT 033.061.010

RESEARCH STAFF MEMBER Conduct research to solve difficult entry & interchange problems in the office workstation environment; dev other that is flexible & simple to use; improve productivity in business offices. Expertise in "C" programming, VM/PC ASSEMBLER, generic markup & document formatting algorithms, h/& sensitivity to language/cultural differences in Latin alphabet languages/Indo-European & user friendly human factor approaches; k/& exp in operating systems. Theory & dvpmnt of interactive text processing tools for work-station environment, Masters elec eng or comp sci + 5 yrs in job or 8 yrs as Systems Eng-designer of comp system interface & operating systems req'd. 40 hr/wk, 8:00 - 4:42. $53,500/yr. EOE. Resume to: NYS Job Svc, 55 Church St, White Plains, NY 10601. JO#0701748, DOT 033.167.082

Systems Analyst, EDP. Develop & write computer program for co. In interm shipping indust. Analyze bus & operating procedures of clients, study reviq problems such as ship's stability. Convert data into software, adapt general programs for spec. needs, revise and correct programs. Do special studies and investigations re: developm. of new info systems. Must know Basic and C languages, use team data base. 35 hrs/wk., hrs: 9-12 am, 1-5 pm. B.A. Comp. Sci. and 1 yr's exp. req. $23,000/yr. Mail resumes to: NYS Job Servire JO #NY8021828, 175 Ramsen St, 2nd Floor, Brooklyn, NY 11201. DOT Code 012167066

Console Operator – Initiate job runs within the ACP/TPF computer systems, including hardware switching and other prescribe processes. Requires 2 months training on IBM's ACP Operating Systems. 2 years experience in job offered or 3 years experience as computer operator on on-line, multi-console systems, i.e. ACP. Must have experience in airline computer operations, must have experience & be able to operate 3 of 4 computer systems at a time, must have experience in using T-BAR, Data Switch, CCBS's and 9000 series computers, must pass Computer Operations aptitude test, and must be able to distinguish between hardware and software failures and take immediate action at reactive them. Job site Denver, Colorado. 40 hrs/wk, $1870. per mo. Application by resume at nearest Job Service Center referring to J O #CO2734128

ACCOUNTING SYSTEMS DESIGNER – Analyze clients' acctg systems & translate thereof into computer software reqmts. Spec of software programs & then education of the acctg employees on usage of software in those specific situations such as payroll, gent ledger, fin'l statements, prop mgmt & construction costing. Req: Bach or equiv in Acctg, 4 yrs exp or 4 yrs rel occupations exp Acctg System Design & Implementation, knowledge of Accounting Systems Design & Implementation, CPA or Chartered Accountant. Pays: $30,000/yr, 40 hrs/wk (8am-5pm). Apply at Texas Employment Commission, Dallas, TX JO #4842455. Ad paid by an Equal Employment Opportunity Employer

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Design IMS banking systems. Require BS in math, data processing or computer science and 3 years experience including IMS, COBOL, CICS, DL/1 and banking systems experience. Salary is $36,000 per annum. Job in Los Angeles.

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ENGINEERING SYSTEMS ANALYST Conducts analysis of scientific, engineering, and other technical problems and formulates mathematical models of problems for solution by computer. Confer with engineers to determine and evaluate processing variables in designs along with cost of process and of material for the finis base. Uses computer of integrate design with production requirements in order at plan layouts, and institute efficient operation of production schedules of function within time constraints, while maintaining product quality and minimizing the resultant waste scrap from the expensive metals and alloys used in the manufacturing process. B.S. degree in Computer Science or related field such as mathematics, physics with 3 years experience or 4 years related experience involving computer technology. $30,000/yr. 40 hrs/week. Send this ad and resume to 10 Autry/Irvine CA 92718-4288 Attn: job opening.

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Send resume to:

**Ulster County Personnel Department**
Box 1900
Kingston, NY 12401
no later than August 22 1986

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RESEARCH STAFF MEMBER: Resrch in theoretical aspects of database mngmnt. Wrk on computational problems related to manipulation of database constructs & to parallel evaluation of database queries. Perform basic resrch into computational complexity of logical theories, particularly lattice theory. Dev relationships theory of parallel computation & theory of program semantics. Req's deep understanding of theory of computation, complexity theory, formal langs, programming langs, & natural lang processing, in addition to database theory. Req's proven ability to do resrch in these areas as demonstrated by strng publication record in fields of database theory & algorithms. & presentation of results of resrch to conferences. PhD theoretical comp sci + 2 yrs in job or 2 yrs resrch/teaching database theory req'd. 40 hr/wk; 8:30am-5:12pm; $50,000/yr. EOE. Resume to: NYS Job Svc, 55 Church St, White Plains, NY 10601. Include JO#0705235. DOT 020.067.014

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**PROGRAMMER ANALYST II**

**State of Oregon, Judicial Department, Salem, Oregon**

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Submit applications to Kathy Duncan, Technical Services Manager, Supreme Court Building, Salem, OR 97310

Applications may be submitted through August 31, 1986

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Programmer/Analyst - Analyze users needs, design, develop, implement and maintain online systems utilizing COBOL, RPGII, SYNCSORT, EASYTRIEVE software on IBM mainframes. Bachelor's degree in Computer Science. 2 years experience. 40 hours per week. $37K per year. Mail resume: NYS Job Service, JO #NYB019272, 175 Remsen St., 2nd Floor, Brooklyn, NY 11201. D.O.T. 012.167.066.

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Systems Anslyst - Plan, sched. direct prep programs to process bus. dsts/solve pblms. Clarify pgrams intent, suggest change, design/set up pgrms. 1 yr exp as systems analyst, $39,998 yr 9AM-5PM 40 hrs. RPGII, specializing in banking, collection, L/C's reimbursements. Mail resume to: NYS Job Service, 97-45 Queens Blvd., Rego Park, N.Y. 11374 Order #NY801-2794 #012.167.066.

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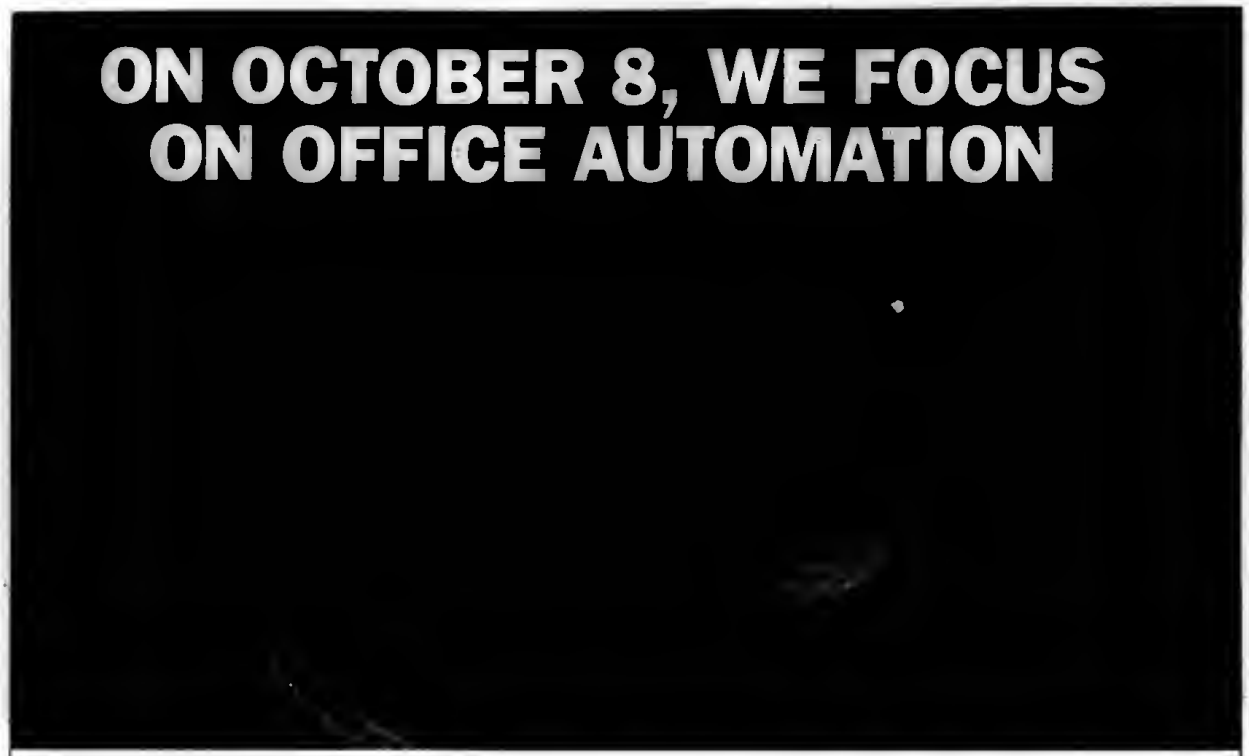
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INDUSTRY NOTES

# Intel announces layoffs, shutdowns

**Intel Corp.** announced layoffs totaling 1,320 employees at two Caribbean manufacturing operations. The chip maker will close its Barbados plant employing 900 people and will reduce its Puerto Rico work force by about 50%.

Intel Chairman Gordon Moore said that "substantial excess capacity" contributed to Intel's $42.5 million loss in the first half of this year. The company will take a charge of $35 million to $45 million in the third quarter as a result of the actions.

■

**Convergent Technologies, Inc.** said it will acquire two Uccel Corp. divisions selling to the accounting market. For $28.5 million in cash, Convergent will buy Uccel's Pensacola, Fla.-based Digital Systems Division, which supplies turnkey systems, and Open Systems, Inc. of Minneapolis, a Uccel supplier of microcomputer accounting software.

Since last November, Convergent Technologies has also acquired vendors of turnkey systems to the legal and dealer/distributor vertical markets.

Separately, Uccel said its income from continuing operations rose 56% to $3.3 million, or 19 cents per share, for the second quarter ended June 30. Revenue increased 15% to $38 million.

■

In a move that will result in the layoff of 225 employees and the furlough of 270 more, **Tandon Corp.** announced it will discontinue operations at its San Jose, Calif., Microtek Storage subsidiary, consolidating most manufacturing of its Winchester hard disk drives in Singapore, according to a Tandon representative.

Tandon says it anticipates a "substantial net loss" for the quarter ended June 29.

■

**Harris Corp.** split its Information Systems Sector into two sectors in order to "increase market focus and improve operating results," a spokesman said.

The Systems Sector previously was a combination of the Business Information Systems Sector, now spun off and renamed the Lanier Business Products Sector, and the Information Systems Sector, which includes the five product and marketing divisions as befnre, the company said. No changes in product strategy or marketing efforts are anticipated, and no isyoffs are expected, the company said.

■

**Eagle Computer, Inc.** ceased operations and filed for liquidation under Chapter 7 of the Federal Bankruptcy Code recently, after it was unable to reach agreement on a reorganization plan with its creditors.

The microcomputer manufacturer had been in Chapter 11 proceedings for more than a year, owing creditors more than $7 million in secured and unsecured debt.

# DG ordered to end bundling

From page 118

with," says attorney James Marcellino of Gaston Snow. "It diminishes somewhat the business prerogatives of those marketing software.

"It's one thing to say you can't tie it and quite another to say you must make it available to qualified spplicants," Marcellino adds.

Patel's order follows last year's U.S. Supreme Court decision not to hear the case.

That decision reaffirmed a 1984 decision that DG's license restrictions were against federal antitrust isws.

A trial held in order to determine damages in the case is expected to open in San Francisco in the first half of 1987.

# DEC licenses VAX to Raytheon

From page 118

military computer marketplace is worth billions of dollars per year.

He would not say what portion of that market Raytheon hopes to garner with the VAX-based systems, but other companies in the market are receiving military computer orders worth between $100 million and $200 million per year, he said.

Raytheon will rebuild and market the VAX-based systems to meet military specifications and a range of real-time processing needs, such as command and control, ground, airborne and shipboard military applications.

Ruggedizing equipment for military use requires making it capable of withstanding various environmental factors, such as extreme heat and cold and nuclear radiation, according to Walter Stowell, general manager of Raytheon's Equipment Division, which will develop the systems.

The resulting computer family will consist of several VAX processor configurations, each supporting high-performance military and commercial I/O channels.

The units will run under DEC's VAX VMS operating system, and they will support all of DEC's existing VAX software, according to s DEC spokesman.

Units are expected to be available in 1988. All of DEC's VAX software will be sold through Raytheon for the military systems customers, Stowell said.

Some of the new system's circuitry will be manufactured by Raytheon's Microelectronics Center in Andover, Mass., a $37 million unit opened last year to build very high speed integrated circuit CMOS chips.

# Honeywell prospects strong if economy turns around

**ACTIVE ISSUES**
Kathy Porteus

When the stock market tumbled in early July, Honeywell, Inc. (HON — 64) fell head over heels.

Less than two months ago, Honeywell traded around 79 and was considered a favorite among mainframe analysts. But growing investor uneasiness about the economy, which drove down many computer stocks, more harshly affected Honeywell because of the company's ultrasensitivity to economic conditions.

Yet according to analysts, such sensitivity is what will quickly propel Honeywell shares when investors regain confidence in the economy.

"Honeywell has everything going for it but too much exposure to the economy," says Peter Labe, mainframe analyst with Drexel Burnham Lambert, Inc. According to Labe, the company is well managed, financially sound and brings good returns on assets and equity. Despite his praise for the company, Labe remains neutral on Honeywell stock because continued economic sluggishness will keep a lid on earnings growth.

During its second quarter ended June 30, Honeywell earned 80 cents per share on $1.73 billion in revenue, down from $1.14 per share a year ago. Unlike companies like NCR Corp. and IBM, which derive nearly half of their revenue from international sales, Honeywell makes fewer than one-third of its sales in foreign markets. Therefore, the effect of the weaker U.S. dollar is not significant to Honeywell's results, according to Barry Bosak, analyst with Eberstadt Fleming & Co.

Although Honeywell is still considered the H in the BUNCH, the dated acronym for mainframe competitors to IBM, analysts say interest in Honeywell has grown because it is more of an industrial-controls firm than a computer company. Steven Milunovich, analyst with the First Boston Corp., says the "weakness in today's market points out that the more one competes against IBM, the tougher it's going to be down the road."

By becoming leaders in process control systems and products, Honeywell has reduced its exposure to computer industry conditions and positioned itself for the anticipated high growth in factory automatioo. Honeywell's computer business currently represents roughly 25% of corporate revenue and assets.

However, supplying control systems for factories and oewly constructed commercial buildings is more economically sensitive. Therefore, analysts suggest Honeywell as a good place to "play" when signs of an economic upturn emerge.

Milunovich recommends purchase of Honeywell because of the stock's current "cheapness" and its limited downside, owiog to the company's stock-boyback program and book value of $56. Nevertheless, Milunovich acknowledges that Honeywell represents a long-term investment owing to the unknown timing of an economic rebound.

Milunovich estimates the company will earn $5.20 per share in fiscal 1986, ending Dec. 31, vs. $6.02 last year. He expects Honeywell to earn $6.50 per share in fiscal 1987.

While the economy continues to dictate near-term prospects, Honeywell, according to Drexel's Labe, cootinues to gracefully and gradually de-emphasize its computer business.

"Nobody is going to buy its [computer] business," Labe says, "so the company must, one, satisfy its installed base with new prodocts; two, increasingly transfer that overseas and become, in effect, a distributor; and three, perform a couple of special applications well." To this end, Labe adds, "Honeywell is playing its cards very well."

*Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.*

# VAR sues Burroughs over printer

**By Clinton Wilder**

TAMPA, Fla. — A Tampa-based value-added reseller has filed a $40 million federal lawsuit against Burroughs Corp., alleging that Burroughs fraudulently misrepresented the capabilities of its 9290-30 laser printer.

Plaintiff Megacom, Inc., seeking $10 million io actual and $30 million in punitive damages, claims the product cannot produce the 750,000 impressions per month promised by Burroughs and that the impression quality is "deplorable."

Megacom President John Nelson said his company essentially staked its future on reselling the 9290-30 and oow faces severe financial pressures because the product does not perform as promised by Burroughs.

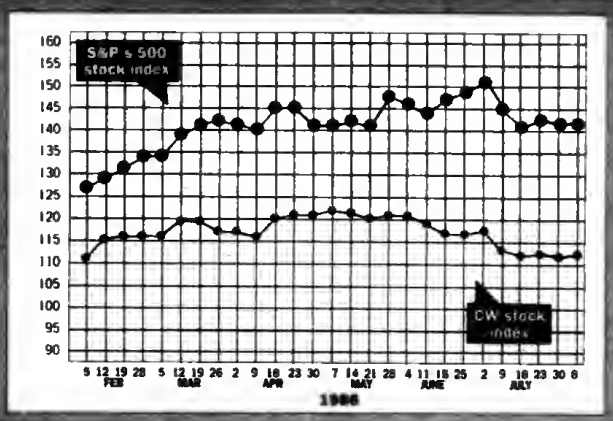
"We went public in June 1985 and included Burroughs' product representations in our prospectus as the central focus of our business plan," Nelson said. "We relied on positions that they took on the printer's capability and speeds. We have found the printer to be substandard in the market."

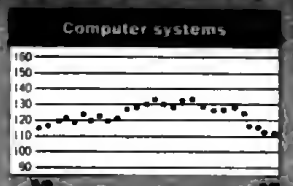
A spokeswoman for Detroit-based Burroughs said the vendor had not yet reviewed the suit and declined to comment.

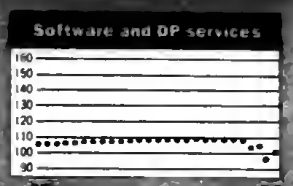
## COMPUTER INDUSTRY

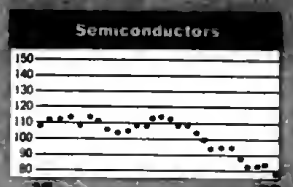
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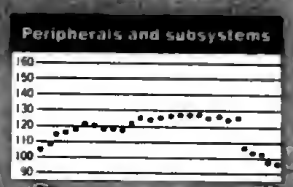
# Computerworld stock trading index



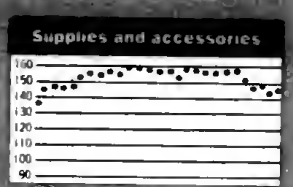










| | 7/30/86 | 8/6/86 |
|---|---|---|
| Computer systems | 111.6 | 110.9 |
| Software and DP services | 97.3 | 100.2 |
| Peripherals and subsystems | 99.3 | 98.5 |
| Supplies and accessories | 143.3 | 146.6 |
| Semiconductors | 81.6 | 75.0 |
| Leasing companies | 93.0 | 97.0 |
| CW stock index | 112.2 | 112.6 |
| Standard and Poor's 500 stock index | 141.5 | 141.6 |

# Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, AUGUST 6, 1986

### COMPUTER SYSTEMS

| EXCH | | 52 WEEK RANGE (1) | | CLOSE AUGUST 6 1986 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|---|
| O | ALPHA MICROSYSTEMS | 6 | 4 | 4.50 | -0.5 | -10.0 |
| O | ALTOS COMPUTER SYS | 16 | 10 | 10.75 | -2.1 | -16.5 |
| A | AMDAHL CORP | 16 | 10 | 17.38 | +0.8 | +4.5 |
| O | APOLLO COMPUTER INC | 16 | 6 | 10.00 | -0.4 | -3.8 |
| O | APPLE COMPUTER INC | 38 | 14 | 31.13 | +0.6 | +2.0 |
| N | AT&T | 25 | 20 | 24.00 | +0.1 | +0.5 |
| N | BURROUGHS CORP | 72 | 52 | 66.63 | -0.3 | -0.4 |
| O | C P T CORP | 7 | 4 | 4.25 | +0.1 | +3.0 |
| N | COMPAQ COMPUTER CORP | 16 | 6 | 13.63 | +0.3 | +1.9 |
| A | COMPUTER CONSOLES INC | 12 | 6 | 7.50 | -0.6 | -6.3 |
| O | CONCURRENT COMP CORP | 25 | 1 | 11.50 | -0.6 | -7.1 |
| N | CONTROL DATA CORP DEL | 27 | 15 | 20.88 | +0.1 | +0.6 |
| O | CONVERGENT TECH | 14 | 6 | 6.25 | +0.1 | +2.0 |
| N | CRAY RESH INC | 100 | 44 | 80.75 | -8.1 | -7.1 |
| O | DAISY SYS CORP | 32 | 9 | 8.50 | -0.5 | -5.8 |
| N | DATA GEN CORP | 50 | 30 | 31.50 | -1.5 | -4.6 |
| N | DATAPOINT CORP | 13 | 5 | 7.25 | +0.3 | +3.6 |
| N | DIGITAL EQUIP CORP | 94 | 50 | 69.75 | -2.3 | -2.4 |
| N | ELECTRONIC ASSOC INC | 7 | 4 | 3.75 | -0.1 | -3.2 |
| N | FLOATING POINT SYS INC | 68 | 14 | 14.50 | -2.1 | -12.8 |
| N | GOULD INC | 38 | 15 | 16.63 | +2.6 | +17.2 |
| N | HARRIS CORP DEL | 38 | 22 | 27.75 | -0.8 | -2.8 |
| N | HEWLETT PACKARD CO | 68 | 29 | 39.88 | +0.6 | +1.6 |
| N | HONEYWELL INC | 67 | 59 | 63.88 | +1.4 | +2.2 |
| N | IBM | 162 | 122 | 131.13 | -1.1 | -0.8 |
| O | IPL SYS INC | 4 | 1 | 2.75 | -0.3 | -8.3 |
| N | ITT CORP | 60 | 32 | 50.38 | -3.6 | -6.7 |
| N | M A COM INC | 21 | 13 | 16.13 | +1.4 | +9.3 |
| N | MATSUSHITA ELEC INDL LTD | 100 | 49 | 82.63 | +1.0 | +1.2 |
| O | MENTOR GRAPHICS CORP | 21 | 11 | 11.38 | -1.6 | -12.5 |
| N | MODULAR COMPUTER SYS | 6 | 6 | 8.88 | +0.0 | +0.0 |
| N | MOHAWK DATA SCI CORP | 4 | 1 | 1.88 | -0.4 | -16.7 |
| N | NBI INC | 17 | 9 | 9.38 | -0.4 | -3.8 |
| N | NCR CORP | 57 | 31 | 50.00 | +0.3 | +0.5 |
| N | PRIME COMPUTER INC | 38 | 15 | 19.50 | +0.1 | +0.6 |
| N | SPERRY CORP | 78 | 68 | 75.25 | +0.0 | +0.0 |
| O | STRATUS COMPUTER | 38 | 15 | 19.50 | +1.3 | +6.8 |
| O | SYMBOLICS INC | 16 | 7 | 8.88 | -0.6 | -8.3 |
| O | TANDEM COMPUTERS INC | 36 | 13 | 33.50 | +0.1 | +0.4 |
| N | TANDY CORP | 69 | 32 | 34.63 | -1.9 | -5.1 |
| N | TEXAS INSTRS INC | 188 | 88 | 103.63 | -5.4 | -4.9 |
| A | ULTIMATE CORP | 38 | 11 | 14.50 | -1.0 | -6.5 |
| A | WANG LABS INC — B | 23 | 12 | 13.75 | -1.1 | -7.8 |
| A | WANG LABS INC — C | 23 | 11 | 13.13 | -1.8 | -11.0 |
| N | XEROX CORP | 72 | 60 | 52.13 | -1.3 | -2.3 |

### SUPPLIES & ACCESSORIES

| | | | | | | |
|---|---|---|---|---|---|---|
| N | AMER BUSINESS PRODS | 37 | 25 | 30.38 | -0.4 | -1.2 |
| N | BARRY WRIGHT CORP | 25 | 17 | 19.00 | +0.8 | +4.1 |
| A | DUPLEX PRODS INC | 23 | 17 | 20.13 | +0.4 | +1.9 |
| N | ENNIS BUSINESS FORMS INC | 38 | 15 | 24.00 | +1.0 | +4.3 |
| N | 3M CO | 115 | 74 | 109.75 | -1.5 | -1.3 |
| N | MOORE LTD | 38 | 16 | 25.00 | -0.6 | -2.0 |
| O | STANDARD REGISTER CO | 50 | 30 | 37.25 | +0.5 | +1.4 |
| N | WALLACE COMPUTER SVCS | 50 | 33 | 46.00 | +0.1 | +0.3 |

EXCH: N—NEW YORK; A—AMERICAN; P—PACIFIC; B—BOSTON; L—NATIONAL; M—MIDWEST; O—OVER THE COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

### SOFTWARE & DP SERVICES

| EXCH | | 52 WEEK RANGE (1) | | CLOSE AUGUST 6 1986 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|---|
| O | ADVANCED COMP TECH | 7 | 3 | 5.25 | +0.0 | +0.0 |
| N | ADVANCED SYS INC | 20 | 11 | 15.75 | -0.4 | -2.3 |
| N | AGS COMPUTERS INC | 25 | 14 | 17.25 | -0.3 | -1.4 |
| O | AMERICAN MGMT SYS INC | 20 | 7 | 17.50 | +0.8 | +4.5 |
| O | AMERICAN SOFTWARE INC | 15 | 6 | 11.50 | +0.0 | +0.0 |
| N | ANACOMP INC | 7 | 3 | 4.50 | -0.5 | -10.0 |
| O | ANALYSTS INTL CORP | 10 | 4 | 4.75 | +0.0 | +0.0 |
| O | ASHTON TATE | 34 | 10 | 22.88 | +1.0 | +4.6 |
| O | ASK COMPUTER SYS INC | 15 | 7 | 10.13 | -0.8 | -5.8 |
| O | ASTRADYNE COMP IND | 3 | 1 | 1.41 | +0.1 | +7.2 |
| N | AUTOMATIC DATA PROC | 38 | 18 | 29.75 | -1.5 | -4.8 |
| O | COMPUTER ASSOC INTL INC | 28 | 10 | 22.50 | +0.0 | +0.0 |
| O | COMPUTER HORIZONS CORP | 15 | 10 | 10.13 | -0.3 | -2.4 |
| O | COMPUTER NETWORK TECH | 10 | 2 | 6.81 | +1.8 | +34.6 |
| N | COMPUTER SCIENCES CORP | 40 | 20 | 34.38 | +1.3 | +3.8 |
| O | COMPUTER TASK GROUP INC | 16 | 12 | 11.75 | -0.6 | -5.0 |
| O | COMPUTER SYS INC | 6 | 1 | 1.88 | +0.0 | +0.0 |
| O | COMSHARE INC | 13 | 9 | 12.25 | +0.4 | +3.2 |
| N | CULLINET SOFTWARE INC | 20 | 8 | 7.88 | -0.3 | -3.1 |
| O | CYCARE SYS INC | 17 | 10 | 12.13 | +0.1 | +1.0 |
| O | DUQUESNE SYS INC | 34 | 11 | 28.50 | -1.0 | -3.4 |
| N | GENERAL ELEC CO | 63 | 56 | 73.50 | -0.4 | -0.5 |
| N | GENERAL MTRS CORP | 50 | 33 | 41.25 | -2.1 | -4.9 |
| N | GTE CORP | 57 | 38 | 54.63 | +0.5 | +0.9 |
| O | HBO & CO | 12 | 4 | 10.00 | +0.0 | +0.0 |
| O | INFORMATION SCIENCES INC | 4 | 1 | 2.50 | -0.5 | -16.7 |
| O | INFOTRON SYS CORP | 23 | 12 | 12.25 | -0.3 | -2.0 |
| O | KEANE INC | 18 | 7 | 7.50 | +0.5 | +7.1 |
| N | MCCAW INC | 43 | 27 | 28.00 | +1.0 | +3.7 |
| O | LOTUS DEV CORP | 38 | 15 | 25.00 | -2.5 | -7.8 |
| O | MANAGEMENT SCI AMER | 16 | 6 | 13.13 | -0.3 | -1.6 |
| O | MCI COMM CORP | 13 | 8 | 6.00 | -1.0 | -11.1 |
| O | MICRO FOCUS | 23 | 11 | 11.25 | +0.3 | +2.3 |
| O | MICRO PRO INTL CORP | 4 | 2 | 2.16 | -0.1 | -5.4 |
| O | MICROSOFT CORP | 38 | 38 | 27.75 | -1.0 | -3.5 |
| O | NATIONAL DATA CORP | 25 | 11 | 18.13 | -0.3 | -1.4 |
| O | ON LINE SOFTWARE INT | 16 | 6 | 11.75 | -0.3 | -2.1 |
| O | ORACLE SYS CORP | 29 | 15 | 14.88 | -1.1 | -7.0 |
| N | PANSOPHIC SYS INC | 38 | 16 | 26.63 | +0.4 | +1.4 |
| N | PLANNING RESH CORP | 24 | 14 | 20.25 | +1.9 | +10.2 |
| O | POLICY MGMT SYS CORP | 24 | 18 | 15.75 | -1.0 | -6.0 |
| O | PROGRAMMING & SYS INC | 11 | 5 | 8.25 | +0.1 | +1.4 |
| O | REYNOLDS & REYNOLDS CO | 35 | 18 | 32.75 | +0.0 | +0.0 |
| O | SCIENTIFIC COMPUTERS INC | 6 | 4 | 4.00 | -0.4 | -8.6 |
| O | SEI CORP | 38 | 15 | 15.75 | +0.0 | +0.0 |
| O | SHARED MED SYS CORP | 41 | 29 | 34.38 | +0.6 | +1.8 |
| O | SOFTWARE AG SYSTEMS INC | 22 | 13 | 17.00 | -0.3 | -1.4 |
| O | SOFTWARE PUBG CORP | 11 | 6 | 6.88 | -0.1 | -2.1 |
| A | STERLING SOFTWARE INC | 21 | 7 | 16.38 | -0.6 | -3.7 |
| N | UCCEL CORP | 23 | 13 | 19.50 | -0.4 | -1.8 |
| N | URS CORP | 16 | 10 | 15.75 | -0.9 | -5.4 |
| O | VM SOFTWARE INC | 32 | 17 | 24.25 | +0.0 | +0.0 |

### SEMICONDUCTORS

| | | | | | | |
|---|---|---|---|---|---|---|
| N | ADVANCED MICRO DEV | 34 | 14 | 14.63 | -1.8 | -10.0 |
| N | ANALOG DEVICES INC | 28 | 14 | 16.75 | -0.5 | -4.3 |
| O | ANALOGIC CORP | 16 | 10 | 10.25 | -0.6 | -5.7 |
| N | APPLIED MAGNETICS CORP | 30 | 12 | 14.75 | +0.3 | +1.7 |
| O | AVANTEK INC | 24 | 16 | 15.75 | -0.8 | -4.5 |
| O | HADCO CORP | 7 | 4 | 4.16 | -0.4 | -8.4 |
| O | INTEL CORP | 32 | 18 | 17.00 | -2.3 | -11.7 |
| O | MICRO MASK INC | 6 | 3 | 3.25 | -0.5 | -13.3 |
| N | MOTOROLA INC | 50 | 38 | 37.00 | -0.5 | -2.0 |
| N | NATIONAL SEMICONDUCTOR | 16 | 9 | 8.75 | -0.9 | -9.1 |
| N | TERADYNE INC | 30 | 17 | 18.63 | -0.4 | -2.0 |

### PERIPHERALS & SUBSYSTEMS

| | | | | | | |
|---|---|---|---|---|---|---|
| A | AM INTL INC | 6 | 3 | 6.50 | +0.1 | +2.0 |
| A | ANDERSON JACOBSON INC | 3 | 2 | 2.13 | +0.0 | +0.0 |
| O | AST RESH INC | 33 | 11 | 11.38 | +0.4 | +3.6 |
| O | AUTOTROL CORP | 10 | 6 | 7.50 | +0.3 | +3.4 |
| O | AVANT GRADE COMPUTING | 6 | 3 | 3.63 | -0.1 | -3.3 |
| O | BANCTEC INC | 13 | 7 | 7.25 | +0.0 | +0.0 |
| N | BOLT BERANEK & NEWMAN | 48 | 38 | 39.13 | +1.5 | +4.0 |
| O | CAMBEX CORP | 2 | 1 | 1.00 | +0.0 | +0.0 |
| N | CENTRONICS DATA COMP | 8 | 4 | 7.00 | +0.0 | +0.0 |
| A | CETEC CORP | 6 | 6 | 6.13 | -0.4 | -5.8 |
| A | COGNITRONICS CORP | 6 | 4 | 3.69 | -0.1 | -3.3 |
| N | COMPUGRAPHIC CORP | 29 | 16 | 17.88 | .14 | 7.1 |
| N | COMPUTERVISION CORP | 19 | 9 | 11.50 | -0.5 | -4.2 |
| N | CONRAC CORP | 19 | 11 | 14.50 | -0.5 | -3.3 |
| A | DATAPRODUCTS CORP | 16 | 11 | 13.38 | -0.3 | -1.6 |
| A | DATARAM CORP | 18 | 5 | 7.50 | -0.5 | -6.3 |
| O | DATA SWITCH CORP | 9 | 4 | 5.38 | -0.3 | -4.4 |
| O | DATUM INC | 7 | 5 | 5.38 | -0.3 | -4.4 |
| N | DECISION INDS CORP | 15 | 6 | 6.00 | +0.0 | +0.0 |
| O | ENDATA INC | 8 | 3 | 5.38 | -0.3 | -4.4 |
| O | EVANS & SUTHERLAND | 27 | 16 | 21.63 | -0.5 | -2.3 |
| N | FLOATING POINT SYS INC | 68 | 14 | 14.50 | -2.1 | -12.8 |
| O | GANDALF TECHNOLOGIES | 6 | 5 | 6.13 | -0.1 | -2.0 |
| N | GENERAL DATACOMM IND | 15 | 6 | 9.38 | -0.6 | -8.5 |
| N | HAZELTINE CORP | 29 | 16 | 16.88 | -0.8 | -4.3 |
| O | ICOT CORP | 13 | 6 | 8.13 | -0.6 | -6.4 |
| O | INFORMATION INTL INC | 16 | 10 | 15.13 | -0.6 | -4.0 |
| O | INTECOM INC | 7 | 3 | 4.75 | -0.3 | -5.0 |
| O | INTERLEAF INC | 15 | 6 | 8.00 | -0.6 | -7.2 |
| O | MEGADATA CORP | 5 | 3 | 3.25 | -0.1 | -3.7 |
| A | MSI DATA CORP | 14 | 6 | 10.13 | -0.8 | -8.0 |
| N | NASHUA CORP | 38 | 12 | 25.75 | 1.0 | 3.7 |
| O | NETWORK SYS CORP | 38 | 10 | 11.75 | -0.3 | 2.1 |
| N | NORTH AMERN PHILIPS CORP | 48 | 32 | 38.13 | -0.8 | -2.4 |
| - N | NORTHERN TELECOM LTD | 38 | 25 | 28.83 | +0.4 | +1.3 |
| O | NOVELL INC | 21 | 10 | 17.25 | -0.5 | -2.8 |
| O | OMEX | 1 | 0 | 0.38 | +0.0 | +0.0 |
| N | PARADYNE CORP | 13 | 6 | 9.63 | -0.1 | 1.6 |
| .A | PENRIL CORP | 9 | 5 | 5.13 | -0.4 | -8.8 |
| N | PLESSEY PLC | 38 | 19 | 29.50 | -0.1 | -0.4 |
| O | PRINTRONIX INC | 15 | 11 | 11.88 | -1.0 | 7.8 |
| O | QMS INC | 16 | 8 | 14.25 | +1.3 | +9.8 |
| O | RAMTEK CORP | 7 | 2 | 5.38 | +0.4 | +2.4 |
| N | RECOGNITION EQUIP INC | 17 | 6 | 11.38 | +0.6 | +8.3 |
| N | SANDERS ASSOC INC | 83 | 25 | 50.88 | +0.1 | +0.2 |
| O | SCAN TRON CORP | 24 | 12 | 16.25 | -0.3 | 1.5 |
| N | SCIENTIFIC ATLANTA INC | 15 | 8 | 8.63 | -0.6 | -5.5 |
| O | SEAGATE TECHNOLOGY | 14 | 5 | 11.25 | +0.0 | +0.0 |
| N | STORAGE TECHNOLOGY | 7 | 1 | 2.75 | +0.0 | +0.0 |
| O | SUN MICROSYSTEM INC | 20 | 13 | 12.25 | -3.0 | 19.7 |
| A | T-BAR INC | 7 | 5 | 5.25 | +0.4 | +7.4 |
| A | TAB PRODS CO | 15 | 10 | 14.25 | +0.0 | +0.0 |
| O | TANDON CORP | 6 | 3 | 3.13 | 1.4 | 30.8 |
| A | TEC INC | 10 | 4 | 5.00 | +0.3 | +5.3 |
| N | TEKTRONIX INC | 85 | 47 | 59.75 | -0.3 | -0.8 |
| O | TELEVIDEO SYS INC | 4 | 2 | 2.63 | -0.3 | -8.7 |
| N | TELEX CORP | 69 | 40 | 54.25 | 1.1 | 2.0 |
| N | TIMEPLEX INC | 24 | 14 | 14.75 | 1.0 | -8.3 |
| N | TITAN CORP | 12 | 5 | 6.00 | +0.6 | +7.5 |
| O | VISUAL TECHNOLOGY INC | 2 | 0 | 0.56 | -0.1 | 10.1 |
| O | WYSE TECH | 16 | 7 | 13.50 | +0.1 | +0.9 |

### LEASING COMPANIES

| | | | | | | |
|---|---|---|---|---|---|---|
| N | COMDISCO INC | 25 | 11 | 17.75 | -0.3 | 1.4 |
| N | CONTINENTAL INFO SYS | 12 | 8 | 8.50 | -0.6 | -8.2 |
| O | FINALCO GROUP INC | 8 | 3 | 3.13 | -0.1 | 3.8 |
| O | PHOENIX AMERN INC | 8 | 2 | 3.88 | +0.1 | +3.3 |
| O | SELECTERM INC | 12 | 6 | 5.38 | +0.4 | +7.5 |
| N | U.S. LEASING | 46 | 32 | 39.25 | +1.5 | +4.0 |

# COMPUTER INDUSTRY

**INSIDE**

With its market share eroding, NCR's ADDS subsidiary refocuses on high-end, value-added terminals/93

Two Comdisco salesmen have been barred from using information obtained from their former employer, Sungard Recovery Services/96

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**INSTANT ANALYSIS**

*"Nothing communicates the importance of a message more effectively than having the founder and CEO of the company deliver it in person."*

**— An Wang, Chairman and CEO, Wang Laboratories, Inc., from his upcoming book, *Lessons: An Autobiography***

## DG ordered to end bundling

### Ruling may alter software license restriction practice

**By Maura McEnaney**

SAN FRANCISCO — Computer industry legal observers believe a recent court action against Data General Corp. is another step toward prohibiting vendor bundling of hardware and operating system software.

The ruling represents another turn against DG in its 8-year-old legal battle with Digidyne Corp. and Fairchild Semiconductor Corp., which has since been acquired by Schlumberger, Ltd. U.S. District Court Judge Marilyn Hall Patel enjoined DG from tying the use of its RDOS operating system software to the sale of its Nova minicomputer line.

"The companies that will be delighted with the case are those that want to build look-alikes," says Susan Nycum, an attorney with the law firm of Kadison, Pfaelzer, Woodard, Quinn & Rossi in Palo Alto, Calif. "It forces people to unbundle their software," she says.

The DG case was initiated by Fairchild and hardware manufacturer Digidyne in 1978 after DG refused to license the RDOS operating system for the manufacture of Nova-compatible machines. The court is giving DG 60 days to comply with the terms of the order.

Dexter Kenfield, an attorney with Gaston Snow & Ely Bartlett in Boston, says the case will require vendors to carefully structure their software and hardware sales. "Everyone is going to continue to look at their marketing arrangement to see if they pass muster in light of this decision," he notes.

Patel's decision also requires DG to make its software available on nondiscriminatory terms to all qualified applicants and to make its line of Eclipse software products available with non-DG hardware. Some observers say the "qualified applicants" wording could have critical marketing implications in the industry.

"It may shave back the discretion of the companies to see who they do business

See **DG** page 116

**INDUSTRY INSIGHT**
Alan Alper

## Ford falls prey to fist of FUD

FUD is back in the news. Not Elmer's last name, but the oft-used acronym meaning the fear, uncertainty and doubt that corporations experience when considering the purchase of non-IBM computer equipment. FUD does not seem to be dissipating as rapidly as some Big Blue competitors would like to say it is.

Ford Motor Co.'s recent selection of IBM as the designated supplier to its North American operation, for which at least $300 million worth of office automation products and services will be purchased over the next five years [CW, July 28], serves as a striking example of FUD in action.

After invoking a 90-day moratorium on the purchase of computer equipment in April, Ford asked its three largest suppliers — IBM, Digital Equipment Corp. and Wang Laboratories, Inc. — to submit proposals to overhaul its entire North American operation's office automation and communications scheme. The operation was suffering from a weighty problem: Computer systems, purchased by its numerous departments from a variety of vendors, were incompatible and could not communicate with one another except over the crudest of bridges.

Ford hoped that, by selecting one vendor whose products spoke in a like tongue, it could bring effective data communications to an operation that, in many ways, resembled the Tower of Babel.

In evaluating the three proposals

See **FORD** page 95

*. Alper is* Computerworld's *Mid-Atlantic correspondent.*

## Ashton-Tate follows trend, acquires line of business graphics

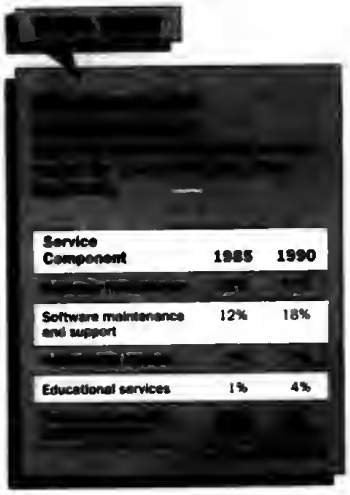
**By Maura McEnaney**

TORRANCE, Calif. — Ashton-Tate added to its collection of leading software packages last week when it announced plans to acquire Decision Resources, Inc., a business graphics software vendor in Westport, Conn.

The acquisition adds Ashton-Tate to the list of leading independent microcomputer software vendors that have recently expanded their product lines into business graphics packages. Lotus Development Corp. recently acquired Graphics Communications, Inc. of Waltham, Mass. [CW, June 2].

In its latest acquisition, the third in as

See **ASHTON-TATE** page 95




## Europe criticizes U.S.-Japan accord, fears chip price war

BRUSSELS — The Commission of the European Community has warned that it could take action under international trade regulations against the agreement reached July 31 between Japan and the U.S. on trade in semiconductors.

The commission said it "cannot accept that Japan and the U.S. determine prices to be paid by European users."

Officials said action might be considered under Article 23 of the General Agreement on Tariffs and Trade, which are international trade regulations designed to protect trading interests.

The U.S.-Japan accord [CW, Aug. 4] calls for the creation of a monitoring system by which Japan would report price and production data concerning its semiconductor industry to the U.S. Department of Commerce. The U.S. convinced Japan to extend the monitoring system to sales made to "third countries," which would include Europe.

European semiconductor makers complained in July to the commission about alleged Japanese dumping of chips in Europe. European vendors are particularly concerned that semiconductor price protection in the U.S. will make Europe the site of the next chip price war.

"With a rise in prices on the U.S. market, automatically, there will be a

See **EUROPE** page 95

## DEC licenses VAX to Raytheon, strengthens stature in military mart

**By Donna Raimondi**

LEXINGTON, Mass. — Digital Equipment Corp. moved to increase its sales in the military market last week by signing a licensing agreement with major defense contractor Raytheon Co.

Raytheon will use DEC's VAX technology to produce computers for military use, with DEC receiving license fees plus royalties on sales. DEC has a similar licensing arrangement with Norden Systems, Inc. of Merrimack, N.H., which has been building military systems with DEC equipment for about 10 years.

"We do a considerable amount of government business now," a DEC spokesman said. "The Raytheon deal will increase our exposure in the military marketplace."

Under terms of the licensing and technology transfer agreement, Raytheon will obtain DEC's VAX computer and chip technologies, including the proprietary VAXBI bus technology, along with DEC's Ada language. Ada is the only language that meets the Department of Defense's critical software requirements, Raytheon said.

Although DEC and Raytheon refused comment on the dollar value of the arrangement, the license fees are reportedly minimal. However, DEC has the potential to gain considerable revenue from royalties on Raytheon's sales to the military.

A Raytheon spokesman said the

See **DEC** page 116

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